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In North America, research in substance use disorders is largely shaped by NIDA and NIAAA. Their funding supports up to 85% of the related research in the world. In Canada, a confluence of circumstances in the 1980s planted the seeds of a research infrastructure for the study of gambling behaviors and eventually the gamut of behavioral addictions. A policy paradigm shift resulted in provincial governments becoming both the regulators and beneficiaries of an exponential expansion of gambling opportunities. The majority of our population gambles regularly as a leisure activity but also in support of a host of charitable causes. Youth is introduced to gambling early on as a form of fundraising. The norming of gambling continues across all ages and for both genders. This expansion set the stage for the study of gambling as an important field of enquiry. Repeated polls supported research as a safeguard to control the human toll exacted by gambling. Provincial government-funded research networks currently provide an estimated 10 million dollars in grants annually. What began as the study of gaming or gambling activities has now evolved into an enhanced understanding of a range of biopsychosocio-cultural variables underlying not only gambling but a host of other risky behaviors. This special issue presents a sample of research activities conducted by Canadian pioneers as well as more recent recruits to our field.

The first two papers focus on adolescent gambling. Dr. Derevensky with the help of Ms. Gilbeau summarizes 25 years of research eliciting a host of risks as well as protective factors moderating gambling related harms. Based on the Pathways Model, Mr. Allami and Dr. Vitaro outline a differential targeted prevention approach with examples of successful programs. Clinicians dealing with adolescents will appreciate the recommendations for assessment and treatment options as well.

Since 2001, the standard self-report measure of problem gambling is the Canadian Problem Gambling Index (CPGI). This instrument has also been translated and adopted in many other countries. Drs. Quilty, Watson and Bagby contribute an original validation of the expanded CPGI-Population Harm to assess harm affecting the gambler’s family and other connected individuals. This approach has been recognized as a more accurate estimate of problem prevalence.

The next 4 papers describe treatment strategies. Ms. Swan and Dr. Hodgins review a body of research in support of self-directed materials and brief interventions that can be utilized in primary care settings. Dr. Ladouceur and team contribute the original validation of a self-help intervention in French, JEu me Questionne (JMQ), resulting in positive outcomes at one and six months.

An additional strategy from Dr. Christensen involves the use of contingency management and a concept of behavioral momentum to increase treatment compliance and improve outcomes. Examples in the outpatient and inpatient settings are included. Linked up perhaps with Dr. Quilty’s assessment of the impact of gambling on the family, Dr. Tremblay and team detail the development of an Integrative Couple Treatment strategy which will be appreciated by couple and family therapists.

The above strategies have cognitive and neurobiological underpinnings reported by Ms. Chu and Dr. Clark. These include impulsivity as a marker of treatment course, the role of dopamine and search for effective medication as well as the proposed role of the insula arising from neuroimaging studies. A working knowledge of responsible gambling tools may also help educate the client with moderation goals. Dr. Wohl and team review responsible gambling features such as animation and pop-up messages leading to the design of a personalized feedback about a gambler’s play.
Last but not least, Dr. McGrath’s paper reviews the mixed impact of a smoking ban policy on gambling revenues and intentions to gamble with non-smokers being more responsive than smokers to the introduction of a smoke-free environment.

In my view, the combined value of the papers is to acquaint the clinician with the breadth of available therapeutic options when encountering a gambler in need of help. These papers will also help disseminate the research findings among the clinical community and hopefully stimulate further collaborative research.

This issue was supported by an unrestricted fund from the Canadian Consortium for Gambling Research (CCGR) to whom we are grateful. Enjoy the issue and feedback is always welcome!

Nady el-Guebaly, MD
Editor-in-Chief, CJA-JCA

Adolescent Gambling: Twenty-five Years of Research

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ABSTRACT

The landscape of gambling has dramatically changed during the past quarter century. Never before have there been such a multiplicity of types of gambling venues and ease of accessibility. All Provinces have multiple and diverse forms of legalized gambling with new opportunities on the horizon. Once thought to be relegated for adults, adolescents have been intrigued with gambling (defined as wagering money in order to win money) and have managed to find ways to gamble on age-restricted games in licensed/regulated venues as well as unregulated forms of gambling (amongst peers). What begins as an exciting benign form of entertainment for most can result in problems for an identifiable group of young people. A growing body of empirical research examining adolescent gambling and adolescent problem gambling has been amassed during the past twenty-five years. Drawing upon this body of literature, the authors address the many issues and correlates impacting adolescent gambling and problem gambling. Clinical and research evidence point to a host of associated academic, behavioral, personality, social, inter-personal, financial, criminal and mental health difficulties for adolescents experiencing gambling-related problems. Other issues discussed include a review of protective factors minimizing gambling-related harms and risks, assessment strategies for identifying youth with a gambling disorder, and ways to help adolescent problem gamblers. The authors suggest that adolescent problem/disordered gambling should be viewed from a public health perspective.

Le paysage du jeu de hasard et d’argent a dramatiquement changé au cours des 25 dernières années. Il n’y a jamais eu autant d’endroits pour jouer et une telle facilité d’accès. Toutes les provinces ont de multiples formules légales de jeux et des nouvelles opportunités à l’horizon. Longtemps perçue comme une activité réservée aux adultes, les adolescents sont maintenant intrigués par les jeux de hasard et d’argent (défini comme faire des paris dans le but de gagner de l’argent). Ils ont réussi à trouver des façons de jouer à des jeux interdits aux mineurs dans des lieux autorisés/réglementés et à des jeux
forms of gambling activities, an average of 79.2% of adults engaged in all gaming expenses) was approximately $13.776 billion. Across measured as wagers less prize payouts, before operation revenues through technologically delivered games. While the vast majority of adults report gambling, the increase in availability, greater diversity of alternate types of gambling opportunities, and easier accessibility has enabled underage youth to gamble on a wide variety of both regulated/approved and unregulated forms of gambling. What began with Provincially-sponsored lotteries has escalated into a multi-billion dollar business including land-based casinos, bingo facilities, electronic gambling machines (EGM’s, VLTs), keno venues, racetracks, lottery outlets, Total Sports Betting Rooms, poker parlors, “Racinos”, and online gambling offerings. In total, there were overall approximately 35,021 venues across Canada in 2012-2013. The amount of revenue generated from government-operated regulated forms of gaming across Canada for this same time period (revenue measured as wagers less prize payouts, before operating expenses) was approximately $13.776 billion. Across activities, an average of 79.2% of adults engaged in all forms of gambling. It should also be noted that these figures do not include non-regulated forms of gambling (e.g., wagering among individuals, wagers placed with a bookmaker, fantasy sports wagering, online wagering via international sites, gambling excursions to venues outside Canada, etc.). Gambling not only represents a highly engaged in recreational activity and form of entertainment but represents a growing source of revenues for governments. Internationally, in spite of some declines in particular jurisdictions, gambling represents one of the fastest changing and growing industries.

**ADOLESCENT GAMBLING**

While gambling has been traditionally viewed as an adult activity, there is ample evidence suggesting its popularity amongst adolescents who continue to engage in both regulated (in spite of age restrictions) and unregulated forms of gambling. This is likely a result of gambling’s general social acceptability, media advertisements, endorsement and sanctioning by governments, and the glitz and glamour associated with casinos. With Hollywood movies depicting and highlighting the potential financial gains, glamour and excitement associated with gambling (e.g., 21, Runner Runner, Casino Royale, Bugsy, etc.) and televised world championship poker tournaments where young people win millions of dollars (the recent World Series of Poker tournament winners have most often been in their twenties), gambling (wagering for money) has grown in popularity amongst youth.

The perceived ease of becoming wealthy without working has resulted in gambling taking on a new level of status amongst adolescents, with becoming a professional gambler (often poker player) being a new preferred vocation. Prevalence studies completed throughout Canada and elsewhere suggest gambling’s popularity among youth. Adolescents, in spite of legal restrictions, have managed to participate, to some degree, in practically all forms of social, government sanctioned and non-regulated gambling, including card playing for money (poker while waning in popularity is still a preferred activity), sports wagering, dice, and board games with family and friends; betting with peers on games of personal skill (e.g., pool, bowling, basketball and other sports); arcade or video games for money; purchasing lottery tickets; wagering at horse and dog tracks; gambling in bingo halls and card rooms; playing slot machines and table games in casinos; gambling
on video lottery/poker terminals; wagering on the Internet; and placing bets with a bookmaker. More recently, we have observed a growing number of youth engaged in these forms of gambling via the Internet or smartphones.

Adolescent gambling behavior can be viewed on a continuum; ranging from non-gambling to social/occasional/recreational gambling to at-risk gambling to problem/pathological/compulsive/disordered gambling (DSM-5 now refers to serious gambling problems as disordered gambling). The terms social/occasional non-problematic/recreational gambling has typically been used to denote occasional infrequent use where the individual is experiencing relatively few gambling-related problems. Individuals identified as at-risk for a gambling problem gambling begin exhibiting some gambling-related problems yet fail to reach the clinical level identified in the DSM-5, while disordered/problem/pathological, or compulsive gambling include behaviors reaching the clinical criteria. Similar to adults, these excessive forms of gambling typically result in severe psychosocial, behavioral, economic, inter-personal and legal difficulties.

Adolescents wagering behaviors have often been found to be dependent upon a number of factors including local availability and accessibility of games, the geographical proximity of gaming locations, the individual’s gender (males tend to be more actively engaged than female adolescents), age (older adolescents are more likely to engage in machine gambling, poker, casino and online gambling), with some research suggesting one’s cultural ethnicity and socio-economic status may impact both the prevalence and popularity of different forms of gambling.

**ADOLESCENT PROBLEM/DISORDERED GAMBLING**

While the vast majority of adolescents gamble occasionally for money and don’t experience significant problems, there is ample research suggesting that adolescents as a group constitute a high-risk vulnerable population for gambling problems. Volberg and her colleagues, after reviewing data from Canadian as well as international prevalence studies concluded that between 60-80% of adolescents report having engaged in some form of gambling for money during the past year (age and accessibility dependent), with most of these adolescents being social, recreational and occasional gamblers. They further noted that prevalence studies have revealed that between 2-8% of adolescents report experiencing serious gambling problems with another 10-15% being at-risk for the development of a gambling problem (variability has been attributed to methodological and measurement/instrumentation differences). Still further, there is considerable research pointing to young adults, ages 18-25, experiencing the highest prevalence of gambling problems amongst the adult population.

While the prevalence rates have typically not increased in spite of greater accessibility, availability, increased diversity of gambling activities, and technological advances (e.g., gambling via online devices), it is important to note that in most regions where prevalence studies have been conducted (including Canada), the population has increased, thus resulting in a greater number of individuals being negatively impacted. It is important to note that disordered gambling not only negatively impacts the individual themselves but relatives, peers, employers and society as a whole.

Adolescents with gambling problems have been reported to experience a wide range of social, economic, personal, academic, mental health, familial, criminal, delinquent and legal problems. As well, these individuals experience poor academic performance, increased rates of suicide ideation and attempts, and difficult peer relationships resulting from their excessive problematic gambling. All of these behaviors place the adolescent at high risk for multiple mental health issues.

Similar to adults with a gambling disorder, adolescents experiencing a gambling disorder report having a preoccupation with gambling; repeated attempts at recouping losses; increasing wagers to reach a physiological level of excitement; lying to family members, peers and friends about their gambling; and exhibiting anxiety and depression when trying to reduce their gambling. Gupta and Derevensky noted early on that a considerable number of adolescents report gambling in order to psychologically escape daily problems (parental, peer, and school-related) and other mental health issues. Gambling then becomes used as a coping mechanism, albeit an ineffective coping mechanism to solve a wide variety of problems.

**UNDERSTANDING ADOLESCENT PROBLEM/DISORDERED GAMBLING**

It is important to note that there is a growing body of literature suggesting that (a) pathological/disordered gamblers are not a homogeneous group, and (b) that some types or forms of gambling, impacted by structural or situational factors, may be more problematic and symptomatic of problem gamblers.

Given gambling by its nature requires increasing amounts of money, many youth acquire funds to fuel their gambling by borrowing large sums of money from
friends, peers and loan sharks, with some escalating to stealing money (most often from their home) and others engaged in a wide range of criminal behaviors. The preoccupation with gambling can take multiple forms (e.g., watching gambling-related shows—poker or sports related shows, playing online social casino games for virtual currency (to improve one's skill or practice), reading books or watching movies with gambling-related themes, with some youth even reporting dreaming about gambling2).

The normalization of gambling (currently referred to as gaming by the industry as they are focusing upon the entertainment value), has led adolescents and young children to frequently engage in this behavior with parents, siblings and family members4. While gambling behaviors typically begin earlier than many other adolescent risky behaviors, there are few self-perceived negative consequences18 and when the negative consequences are realized they are perceived to only occur at a much later time9, often with the individual conveying that they will have stopped gambling by the time the problems become of "serious" concern.

The underlying motivations for gambling and continued gambling in spite of repeated losses are highly variable. Nevertheless, of interest is that winning money is typically not the primary motivation reported by adolescents. Multiple studies among problem gamblers suggest that the primary benefits accrued from gambling are in terms of the excitement (adrenaline rush) and enjoyment derived from the gambling itself. More recent research has shown that a growing number of university students also report engaging in gambling as a way to relieve boredom and loneliness, while others report gambling for the competition, some use gambling as a way of fulfilling other psychological needs, escape from daily stressors (academic, familial or work-related), as a way to reduce anxiety and depression, and still others view gambling as a form of socialization9,20.

CORRELATES AND RISK FACTORS ASSOCIATED WITH PROBLEM GAMBLING: OUR CURRENT KNOWLEDGE

Problem gambling, similar to many other mental health disorders, has been shown to have multiple associated risk factors (see Shead, Derevensky & Gupta9 for a comprehensive discussion of these risk factors). Incorporating a bio-psycho-social-environmental framework allows clinicians to better understand the complexity of problem gambling. There is currently a general acceptance that adolescent problem gamblers do not constitute a homogenous group, with the unique correlates and weightings of the risk factors contributing to problem gambling differing amongst individuals. It is also true that sports gamblers, casino gamblers, poker players and Internet gamblers may differ as to their motivations and their gambling behaviors. As such, there is no single constellation of risk factors that can alone predict with certainty that an individual will develop a gambling disorder. It should also be noted that many of the identified risk factors are similarly associated with other mental health and/or addictive disorders; one of the reasons disordered gambling is now classified as a Behavioral Addiction21.

Modifying the SAMHSA model to include pathological gambling21, we have spent the last two decades focused on identifying the risk factors associated with adolescent excessive gambling problems and to identify possible protective factors as a way to minimize the problems through early intervention.2,9,22,23 While multiple constellations of risk factors, in conjunction with a lack of specific protective factors, likely place certain individuals at high risk for a gambling disorder, there is increasing recognition that the etiology underlying gambling problems is not universal, that the constellation of risk factors may be different for individuals and that a number of distinct pathways may exist which lead certain individuals to pathological/disordered gambling.24,25 Understanding these alternate pathways is thought to have important implications for the effective treatment of gambling disorders.

Our current understanding of the onset and developmental course of gambling problems suggests the importance of adopting a bio-psycho-social-environmental framework.2,11 In a number of empirical research studies and reviews, we have more fully articulated the correlates and risk factors associated with adolescent problem gambling (see Derevensky2,10 and Shead, Derevensky & Gupta9). Our current understanding suggests that (a) gambling remains more popular amongst males than females and more adolescent males than females exhibit severe gambling problems, 2, 3,16 (b) males make higher gross wagers, gamble earlier, gamble on more diverse activities, gamble more frequently, spend more time and
money, and experience more gambling-related problems than females. Adolescents with gambling problems report initiating gambling at an early age (approximately 10–11 years of age). Youth problem gamblers frequently report having had an early “big win.” Initial gambling experiences often originate with family members in their own homes with patterns of gambling eventually changing whereby the peer group becomes increasingly important and gambling activities change based upon evolving interests and accessibility. Adolescents with gambling problems often report having parents who gamble excessively, consume excessive substances, and have been involved in illegal activities. Adolescents with gambling problems often report having friends with similar gambling, or substance abuse problems. Adolescents typically have positive attitudes toward gambling and view it as a socially acceptable behavior and pastime. The vast majority of adolescent problem gamblers fail to acknowledge the severity of their problems, and perceive the risks associated with disordered gambling as a long-term consequence and not of immediate concern. Cultural, ethnic, and racial differences can impact the perceived seriousness of the problem. Problem gamblers score higher on measures of excitability, extroversion, and poorer on measures of social conformity and self-regulation. Adolescents with gambling problems have been shown to exhibit higher levels of state and trait anxiety, impulsivity, risk-taking, measures of disinhibition, boredom susceptibility, impulsivity and other self-regulatory behaviors (e.g., conformity to norms, self-indulgence). Problem gamblers score lower on measures of self-esteem, and school-related problems include increased truancy, delinquent anti-social behaviors, conduct disorders and poor academic performance. Many have been shown to be associated with increased gambling problems. Problem gamblers report a greater frequency of attention deficit hyperactive disorders and conduct-related problems, and are at greater risk for suicide ideation and suicide attempts, and adolescents with gambling problems are also prone to other addictive behaviors. The fact that all these behaviors and risk factors may be interrelated could suggest that problem gambling occurs within a problem-behavior syndrome or framework.

**SITUATIONAL AND ENVIRONMENTAL FACTORS**

While young people have wagered money since the earliest of times, today’s social acceptability and ease of accessibility has enabled our youth to gamble on a greater variety of activities readily available in most jurisdictions. In spite of legal prohibitions, most youth have managed to gamble on age-related governmental forms of legislated gambling or those unregulated (amongst peers, with local bookmakers, or with Internet gambling operators). Major reviews have in general concluded that the greater availability and accessibility of gambling, the greater gambling participation and gambling-related problems. Alternatively, the exposure and adaptation model has been proposed, suggesting that after an initial increase in gambling, the behavior becomes normalized with the thrill and excitement habituating and the levels (frequency and amounts wagered) returning to normal. However, there is ample evidence to suggest that gambling amongst adolescents will not dissipate, especially in light of some of the newer technological modes of gambling that are highly attractive to young people (e.g., social casino gambling, online gambling, and mobile gambling).

Other factors including the enforcement of regulatory prohibitions restricting underage gambling, parental attitudes toward gambling, and peer relationships have all been shown to have an impact upon youth gambling behaviors. Televised poker tournaments where young adults win millions, seductive advertising campaigns, social gaming (in particular social casino gambling even when played for virtual currency), gambling-simulated videogames, as well as movies and television shows with gambling-related themes, and the ease of use of smart phones to wager are important considerations when examining the underlying factors motivating gambling behavior.

The fact that young people with gambling problems do not seek treatment as a way of curtailing their gambling should not come as a surprise. Adolescents, as group, often negate the severity of their problems and are reluctant to seek help for many addictive or mental health disorders.

While most adolescents report gambling for the thrill and excitement, as a way to relieve boredom, as well as an opportunity to make money, clinical reports of adolescents with severe gambling problems indicate that these youth frequently use gambling as a coping strategy to deal with a host of mental health, academic, and social difficulties. There is empirical research suggesting adolescent and young adult disordered gamblers use gambling to help escape past and current problems including daily hassles and major traumatic life events. Lynch et al. and Chambers and Potenza have suggested that these findings need to be considered both from a neurodevelopmental framework and a public health framework.
PROTECTIVE FACTORS

A limited number of empirical investigations have sought to identify the protective factors thought to reduce the incidence of adolescent disordered gambling. Lussier, Derevensky and Gupta and Lussier, Derevensky, Gupta and Vitaro examined the concept of resilience in the presence of identified risk factors as a possible protective factor for youth gambling problems and other adolescent high-risk behaviors. Their results suggest that resilience as a psychological construct is a primary protective factor in buffering gambling disorders. One other factor reported in the literature revolves around family cohesion. Not surprisingly, these factors were advocated to be included in wide scale prevention initiatives, especially since they cut across a number of addictive and mental health disorders.

ASSESSMENT AND MEASUREMENT OF ADOLESCENT GAMBLING SEVERITY

Despite our advances in our understanding of the etiology, correlates and risk factors associated with adolescent problem and disordered gambling, few new screening instruments assessing the severity of adolescent problem gambling have been developed (the most recent addition being the Canadian Adolescent Gambling Inventory (CAGI)). Other adolescent gambling screens have been typically adapted and modified from adult screens while incorporating alternative language and questions with more age appropriate items. The most common instruments include the South Oaks Gambling Screen-Revised for Adolescents (SOGS-RA), and the DSM-IV-J and its revision the DSM-IV-MR-J. The CAGI, while only having limited use, has gone beyond a single measurement scale to include multiple domains of problem gambling severity; assessing multiple types of gambling, their frequency and associated gambling-related problems. Similar to the adult instruments, common constructs underlie most adolescent gambling severity instruments. As such, they typically include underlying psychological factors and the negative financial and behavioral costs associated with excessive gambling.

HELPING YOUTH WITH ADOLESCENT DISORDERED GAMBLING

Given there is no single identifiable cause for gambling problems, there too is no single therapeutic approach that universally works for helping all individuals (see Richard, Blaszczynski & Nower for recent advances in the treatment of disordered gambling and Gupta, Nower, Derevensky, Blaszczynski, Faregh & Temcheff for a discussion of the Pathways Model). In spite of there being no universally accepted empirically validated treatment program established for adolescent problem gamblers, various treatment approaches have been employed, most of which have in general been based upon diverse theoretical approaches paralleling those used for adults including psychoanalytic or psychodynamic, behavioral, cognitive and cognitive-behavioral, pharmacological, psychological, biological/genetic, addiction-based models, or self-help models (for a more comprehensive overview of these models the reader is referred to the reviews by Derevensky, Hodgins, Stea & Grant, Ladouceur & Shaffer, Petry, Richard et al.; Potenza).

There is clear evidence that most adolescents learn from their mistakes and while they sometimes exceed their preset gambling limits, both in terms of time and/or money, and may suffer some short-term consequences, most eventually refrain from excessive gambling; some may stop or curtail their gambling. Yet for some individuals, their physiological needs, perceived skill and knowledge, erroneous cognitions, and/or need for escape from daily and long-term stressors and mental health issues lead them to increase the frequency and intensity of their gambling in spite of their realization that their odds of winning are indeed limited.

The fact that only a small percentage of individuals with a severe gambling disorders perceive themselves as having a gambling problem helps account for the low turnout of adolescents seeking help for a gambling disorder. Perceived barriers to seeking treatment include a desire to manage the problem themselves, denial of problems, distrust of therapists, and shame. To exacerbate the problem, logistical travel considerations and the need to discuss their gambling disorder with parents place adolescents at an even greater disadvantage when trying to seek help.

Derevensky, Derevensky, Temcheff and Gupta, Gupta.
and Derevensky and Gupta, Nower, Blaszczynski, Faregh and Temcheff contend that in the absence of empirically validated treatment programs and varying underlying reasons for gambling, a dynamic interactive treatment paradigm for youth experiencing significant gambling problems needs to recognize the multiplicity of interacting factors. While a cognitive behavioral approach tends to be favored by many therapists, which focuses upon the individual’s erroneous cognitions and beliefs (i.e., a lack of understanding of the notion of independence of events, erroneous perceptions concerning the level of skill required to be successful in predicting the outcome of chance events observable in most gambling activities, and an illusion of personal control and skill), Derevensky, Gupta and Temcheff and Gupta and Derevensky suggest that in addition to helping youth understand laws of probability, independence of events and erroneous cognitions, attention needs to be paid to the underlying motivations leading to excessive adolescent pathological gambling (e.g., depressive symptomatology; somatic disorders; anxiety; attention deficits; self-regulation difficulties; academic, personal and familial problems; mood disorders; high risk-taking; poor coping skills, to name a few). The research on the effective treatment of adolescent disordered gamblers remains limited at best. Reducing the barriers to treatment for adolescents will be necessary before Best Practices can be established. It may well be that some of the previously established treatment models for other mental health disorders and addictive behaviors can be generalized and applied to youth with gambling problems given the significant overlapping risk factors.

While disordered gambling has been clinically viewed as a continuous and progressive disorder, there is clinical support suggesting that it in fact may be episodic where individuals engage excessively for a limited time, experience difficulties, and then stop or reduce their gambling for undetermined amounts of time. This may be viewed as binge gambling. If most youth are not seeking treatment, then possibly they self-correct their behaviors as a process of natural recovery. The field of psychopharmacology may also provide a promising complementary strategy for working with adolescents experiencing gambling problems. While the current pharmacological strategies for treating pathological gambling in adults suggest the use of SRIs, mood stabilizers, and naltrexone, few advances have been made in using medications for adolescents.

Today’s youth live in an environment where gambling opportunities continue to grow, are widely available and viewed as a socially acceptable form of entertainment. As with other high-risk behaviors, disordered gambling can lead to a host of adverse mental health, financial, familial, and judicial problems. Unlike many other adolescent risky behaviors, most parents, teachers and even mental health professionals do not perceive this to be a significant adolescent problem, nor are widespread school-based prevention initiatives available. The gambling industry continues to rapidly change with advances in technology, social casino games, sports wagering, and interactive electronic gambling machines with some skill-based components. These advancements will represent new challenges and areas of research. Often referred to as a hidden addiction, gambling problems amongst adolescents will continue to remain a public health and policy concern unless proactively addressed by policy-makers.

REFERENCES


Pathways Model to Problem Gambling: Clinical Implications for Treatment and Prevention Among Adolescents

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ABSTRACT

The Pathways Model is the most promising etiological model for Gambling Disorders (GD). It suggests that three distinct developmental pathways lead to the emergence of GD (Behaviorally Conditioned, Emotionally Vulnerable, and Biologically Vulnerable), each differentiated by a set of predisposing biopsychosocial characteristics. Empirical research has demonstrated the existence of these three subgroups of gamblers among adults and, more recently, among adolescents. Consequently, treatment for individuals with GD should address the underlying precursors to gambling, as early as possible, in order to effectively generate positive outcomes. However, adolescents with GD are less likely (compared to adults) to seek out treatment. It is therefore necessary to reach out to at-risk individuals. In terms of prevention among youth, existing programs are not successful in reducing the incidence of gambling behavior and GD later in life. Therefore, a differential targeted prevention approach tailored to the gamblers’ specific profile in early adolescence is recommended to minimize the emergence of GD among adolescents and young adults. Some targeted prevention programs have already proven to be successful with regards to substance use and general delinquency, but nothing has yet been done in the gambling field.

INTRODUCTION

DEFINITION AND PREVALENCE

According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), a Gambling Disorder (GD) is evident when there is a presence of four gambling-related problems or more. Other instruments, such as the South Oaks Gambling Screen (SOGS), use different criteria and label gamblers differently (e.g., score 1-4: Some problems with Gambling; score 5 or more: Probable Pathological Gambler). The SOGS was developed based on DSM III criteria, but continues to correlate with recent versions of the DSM. Regardless of whether one uses a dimensional or a categorical approach to understanding GD, there is a general agreement that a number of individuals experience several forms of gambling-related issues. The
prevalence of GD among the general adult population in Canada, when assessed during the previous year, is around 2–3%67. Even though many Western countries, such as Canada, prohibit minors from gambling, many teenagers still gamble independently (with peers) or through more formal channels (e.g., purchasing scratch tickets).

Adolescents (12 to 17 years of age) present higher rates of GD compared to their adult counter-parts68,9. Although not all adolescent gamblers experience gambling-related problems (e.g., stealing money to fund gambling activities), a significant portion may be at-risk due to their frequency of involvement in gambling activities. In fact, Gupta and Derevensky90 reported that 28.2% of high-school students claimed to gamble at least once a week. Furthermore, there is empirical evidence to support that gambling frequency within the adolescent population is a predictor for later gambling problems, independent of current problems9. It is therefore crucial to establish a paradigm which identifies disordered or at-risk gamblers within the adolescent population in order to better direct intervention and prevention efforts, thereby avoiding the negative personal and social consequences that can follow.

CURRENT APPROACHES FOR HELPING ADOLESCENTS

Although many studies and treatment programs have been conducted among adults, very few have been developed for adolescents12,13. Nonetheless, a couple of studies have found promising results for Cognitive-Behavioral Therapy (CBT) in GD patients. However, these interventions focus solely on the cognitive aspects of gambling (e.g., overcoming biased beliefs about winning probabilities). Many disordered gamblers have many pre-occurring conditions that may contribute to their GD, and may require additional help. For example, some may gamble to alleviate depressive symptoms despite rational knowledge about gambling statistics14.

To make matters worse, a smaller proportion of adolescents with a GD actually seek formal treatment (compared to adults)95. Therefore, rather than waiting for adolescents to come to treatment, it is important to reach out to them. Luckily, many adolescents attend school or community centers, thereby allowing mental health professionals to target a wide number of adolescents in an efficient manner.

To date, current prevention programs aimed at minimizing gambling in adolescence have not yielded satisfactory results. Ladouceur, Goulet and Vitaro conducted a thorough review of all empirical studies related to prevention programs targeting children or adolescents44. While most programs were effective in educating youth populations about gambling issues and their associated risks, gambling behavior and gambling problems remained unchanged. Moreover, all programs adopted a universal “one-size fits all” approach (i.e., same program for all gamblers and non-gamblers). This approach may not be effective in dealing with people suffering from a GD or at risk of developing a GD, especially since new research has shown that disordered gamblers are not a homogeneous group.

SUBTYPING OF DISORDERED GAMBLERS

In order to effectively prevent problems that might arise from or precede disordered gambling, it is important to understand the factors which might have led to the emergence of this disorder. Moran96 was the first to suggest different causes for the emergence of GD and identified five types of gamblers: subcultural, neurotic, impulsive, psychopathic, and symptomatic. According to the author, these types may not be mutually exclusive. However, there was very little empirical evidence to support Moran’s theory at the time. Since then, numerous studies have supported the idea that there are different profiles of gamblers, each with a defining set of personal and environmental characteristics97-20.

Milosevic and Ledgerwood22 reviewed 17 empirical studies that classified GD patients according to various biopsychosocial characteristics and they concluded that a three-group model consistently emerged. This model closely resembled the three pathways described by Nower and Blaszczynski22,23 (the “Pathways Model”).

PATHWAYS MODEL OF PROBLEM AND PATHOLOGICAL GAMBLING

The Pathways Model22,23 puts forward three developmental profiles leading to a GD, each of which is characterized by a set of predisposing risk factors and consequences that result from gambling. The first profile (Pathway #1) relates to “Behaviorally Conditioned” gamblers who do not exhibit any biological or affective predisposition. These individuals start to gamble for reasons connected to excitement and socialization, and fluctuate between regular and excessive gambling depending on effects of conditioning. Affective problems (e.g., depressive symptoms) associated with their gambling are understood as a consequence of their gambling, rather than a precursor. This subgroup is the most responsive to treatment and should be the easiest to prevent from experiencing gambling-related problems.

The second pathway identified by Blaszczynski and Nower refers to “Emotionally Vulnerable” (Pathway #2) gamblers, who suffer from an underlying affective
dysregulation. Although they are vulnerable to the same conditioning processes and ecological risk factors as the “Behaviorally Conditioned” subgroup, the “Emotionally Vulnerable” gamblers engage in disordered gambling in response to their affective state, as a means of emotional regulation. These gamblers can also adopt other maladaptive behaviors (e.g., drug use) to cope with their emotional difficulties. Their disordered gambling levels are fairly steady and more severe than Pathway #1 gamblers. They are also more resistant to treatment, as the reasons underlying their gambling (i.e., emotional regulation) also need to be addressed. “Emotionally Vulnerable” gamblers therefore require a different form of preventive or curative treatment compared to “Behaviorally Conditioned” gamblers.

The final subgroup of disordered gamblers, i.e., the “Biologically Vulnerable” (Pathway #3) gamblers, display psychosocial vulnerabilities similar to those of Pathway #2. However, they are distinguished by their biological, and possibly genetic, vulnerabilities; critical brain regions involved in impulse-control are affected. These gamblers can manifest a range of behaviors typically associated with impulse-control disorders. For example, they may exhibit higher percentages of Attention Deficit Hyperactivity Disorder (ADHD), non-gambling related antisocial or delinquent behaviors, multiple drug use, and a family history of antisocial behavior. The most severe levels of disordered gambling are found within this subgroup. Its members are also the most resistant to treatment, as well as to prevention efforts.

The Pathways Model has palpable implications for the prevention of GD. Its assumption is that each pathway develops a GD for distinct reasons. Therefore, each pathway must be addressed in a unique way.

**EMPIRICAL SUPPORT FOR THE MODEL**

Many studies have identified three subgroups among adult disordered gamblers that closely resemble the three pathways, both in clinical settings and in the general population. Research with adolescents is more scarce. Gupta and her colleagues were the first to attempt the empirical validation of the Pathways Model within an adolescent population. The study revealed the presence of five subgroups of gamblers, including three which fit with Nower and Blaszczynski’s theoretical model. The additional two groups consisted of one group that only showed symptoms of depression and another exhibiting both internalizing and externalizing symptoms (this last group was deemed to represent a hybrid between pathways #2 and #3). Hyperactivity symptoms were found to be present in four out of five groups, whereas the Pathways Model expects them to only be present among Pathway #3 gamblers.

Allami et al were the first to use a longitudinal design to empirically validate the Pathways Model among adolescents. The authors identified three subgroups based on a set of risk factors that were measured when the participants were 14 years old (impulsivity, delinquency, symptoms of depression, and drug use). The three subgroups closely resemble the different pathways described in the Pathways Model. By assessing these same variables when participants reached 17 and 23 years of age (i.e., once gambling problems had already emerged), the authors observed a worsening of depressive symptoms, general delinquency, and drug use. This longitudinal comparison helped the authors determine which personality characteristics and behaviors preceded the emergence of gambling problems and which ones resulted from it.

In sum, there is growing empirical evidence to support the notion that there are three major pathways to disordered gambling in adolescents, much in the same way as for adults. Therefore, it is becoming increasingly evident that all gamblers do not develop a GD for the same reasons. Treatment and prevention programs should be tailored according to the pathway taken by the individual. By doing so, treatment providers target the underlying cause behind the symptom, rather than simply minimizing the GD symptoms.

**THE FUTURE OF PREVENTION FOR ADOLESCENT GAMBLING**

Prevention programs are divided into two main categories. Universal prevention programs target the general population without taking into account the individual characteristics of the people participating in the program. An example would be a prevention program administered to all high school students. Targeted prevention programs aim for a subset of the population that displays risk factors known to be related to a specific

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† This group was initially labelled “Antisocial-Impulsivist” but has been renamed “Biologically Vulnerable” since the original publication of the Pathways Model (A. Blaszczynski, personal communication, July 12, 2014)
problem. Targeted prevention programs are called “indicated” if the risk factors used to screen the participants refer to personal characteristics (i.e., impulsive individuals or daily gamblers). They are called “selective” if the risk factors used to screen the participants refer to environmental features (i.e., adolescents with gambling parents or exposed to internet gaming). As suggested by the Pathways Model, people with a GD differ in relation to their predisposing risk factors. Therefore, prevention programs should also consider the specificities of each pathway (i.e., using a differential targeted approach).

TARGETED INTERVENTIONS FOR AT-RISK YOUTH IN LIGHT OF THE PATHWAY MODEL

In Canada, targeted (either selective or indicated) prevention programs for GD have yet to be implemented among adolescents14 (i.e., 17 years old and younger). It is critical for such programs to be able to correctly identify individuals at risk of developing the disorder in order to adjust their targets and contents accordingly. A trial prevention program called Pre-Venture has already been conducted to thwart substance abuse using a differential approach27-30. Participants are split into four groups according to their personality-types (anxiety-sensitivity, hopelessness, impulsivity, and sensation-seeking) using the Substance Use Risk Profile Scale (SURPS)31, a short 23-item questionnaire.

As described by Conrod et al29, interventions revolve around three aspects: psychoeducation, behavioral coping skills training, and cognitive coping skills training. The workshops start with group activities that encourage participants to name problematic coping behaviors associated with each personality profile. Then, through motivational interviewing, participants weigh the short and long-term consequences of a particular behavior. Coping skills (cognitive and behavioral) focusing on aspects that are particularly difficult for each personality profile are taught to the participants, and enacted through role-play using scenarios taken from adolescents’ real lives. Remarkably, studies measuring the efficacy of the program found that only two 90-minute group workshops were sufficient to have a positive impact on adolescents’ drinking behavior28-30. This influence lasted for up to two years after these programs were implemented27.

With regards to gambling, the Pathways Model framework should serve as a stepping stone for identifying individuals who are at risk of developing a GD. First, adolescents should be screened for any engagement in gambling activities and gambling-related problems (e.g., using the SOGS). Social and at-risk gamblers should also be included because we know that disordered gamblers transition rapidly from social gambling (i.e., no gambling problems) to disordered gambling32. Hence, it is worthwhile to include all gamblers in a targeted prevention program and provide treatment for their underlying clinical disorders (e.g., internalizing or externalizing disorders). It is worth noting, however, that individuals with severe levels of GD may not fully benefit from these programs, and may require individualized attention (Gupta and Derevensky15 have written a thorough chapter on how to take into account elements from the Pathways Model when providing treatment to adolescents with a GD in a clinical setting).

After this initial screening, participants should be classified into one of the three pathways. The personality types identified by the SURPS closely resemble the ones described by the Pathways Model. Therefore, this instrument could also be used to classify gamblers into the Behaviorally Conditioned (low on all four personality dimensions), Emotionally Vulnerable (predominantly high on anxiety-sensitivity and hopelessness), and Biologically Vulnerable (predominantly high on impulsivity and sensation-seeking) pathways. Once identified, gamblers from each pathway should receive their own form of treatment.

BEHAVIORALLY CONDITIONED GAMBLERS

Pathway #1 gamble mostly because of social influences and cognitive distortions. Programs designed for them should address these two aspects. The content of such a program should include lessons on how to develop resistance skills, as well as information about winning probabilities and common misconceptions (e.g., the gambler’s fallacy: the erroneous belief that if a coin-flip yields “tails” 10 times in a row, then the next coin-flip has a higher chance of yielding “heads”). These elements could be integrated into an already established program designed to address issues such as bullying or substance use.

Existing treatments for youth with GD have been demonstrated to successfully modify maladaptive cognition distortions and could serve as a starting ground for developing corresponding workshops in schools. The results from one of these studies indicated that younger children (10 vs. 12 years old) were more likely to adjust their beliefs (i.e., believe that luck, rather than skill, is a major component of gambling outcomes). These protective beliefs were extended to other gambling activities, but not to non-gambling related activities (i.e., such as those that are skill-driven).

With regards to resisting the effects of peer pressure (a significant risk-factor for behaviorally conditioned...
gamblers), McGuire developed Inoculation Therapy, that has successfully guided prevention programs with encouraging results with regards to alcohol use and smoking behavior. Such programs rely on the psychological principle that when people are confronted with a persuasive message which goes against their initial beliefs (e.g., a peer encouraging another to engage in a risky behavior), their position is strengthened if counter-arguments to the persuasive message are prepared in advance. A prevention program designed for gambling may seek inspiration from these previous programs. For example, a deviant peer may try to convince a Pathway #1 gambler that losses may be won back through persistence. Arming the participant with counter-arguments (e.g., information about probabilities) may reinforce their protective position, thus preventing them from developing a GD.

**EMOTIONALLY VULNERABLE GAMBLERS**

Individuals at risk of following the second pathway to problem gambling first develop internalized disturbances (e.g., anxiety, depression) which are followed by maladaptive coping behaviors to handle this distress. Gambling behavior emerges as a form of coping mechanism to escape this distress. It is therefore necessary for these individuals to acquire adaptive coping skills to help resist succumbing to the temptation of choosing instantly gratifying, yet maladaptive, solutions.

The Pre-Venture trial described earlier may provide useful insights for implementing a prevention program for gambling problems even though the study related to substance use. Participants with a “anxiety-sensitivity” or “hopelessness” personality type were taught to recognize and modify cognitive distortions, which were taken from previously developed cognitive restructuring interventions for anxious and depressed individuals. A program built around the Pathways Model would follow the same rationale by targeting Pathway #2 gamblers. In this case, clinicians specialized in internalizing disorders are encouraged to work with this subgroup of gamblers.

**BIOLOGICALLY VULNERABLE GAMBLERS**

The high-risk individuals from Pathway #3 display a propensity to gravitate toward immediately-gratifying activities. Although this group may also exhibit emotional disturbances, their impulse-control deficiency is understood as being biologically determined (i.e., result from neurological abnormalities), rather than as a consequence of their emotional turmoil. These individuals may benefit from learning adaptive emotional coping skills, but the primary concern with regards to their gambling behavior is at the impulse-control level. Individuals who fit this profile also exhibit delinquent behaviors independent of their gambling. Therefore, gamblers in this subgroup should strengthen their capacity to delay gratification and inhibit impulses, as well as diminish their co-occurring risky behaviors; all of which can clearly have adverse consequences on their well-being. The Pre-Venture trial has demonstrated the efficacy of targeting cognitive distortions to prevent substance abuse among impulsive and sensation-seeking individuals. These intervention techniques were inspired from previously validated intervention techniques.

Other successful programs have already targeted these high-risk populations. For example, the Montreal Experimental Program (MEP) is a promising prevention program that has proven itself to be effective in reducing general delinquency and substance use among male adolescents. The MEP is a 2-year program aimed at highly disruptive children who have been screened before they completed kindergarten. The disruptiveness scale used in this program evaluates aspects of hyperactivity–aggressiveness and opposition-related behaviors; two dimensions that are reminiscent of the Biologically Vulnerable pathway.

A notable strength of this program is the fact that prosocial boys were included in the intervention group. This was done for two purposes. First, prosocial boys served as positive models and reinforcement agents. Second, this integration encouraged targeted children to participate without being stigmatized by their peers. The MEP also includes a parent-training component. Dretzke and her colleagues conducted a meta-analysis of 57 studies examining the impact of parenting programmes for children displaying conduct problems and concluded that parenting modules contribute significantly to the desirable effects of prevention programs. In addition, some authors have found that proper parent supervision successfully prevents delinquency and substance use among adolescents.

Once Pathway #3 individuals develop a gambling disorder, they are the most resistant to treatment. Therefore, they may also require more resources in terms of prevention. In order to effectively target this group of gamblers, a substantial multi-modal approach would be necessary. We therefore recommend that programs should consider
implicating parents, school boards, peers, as well as the at-risk individuals in order to be effective. Such programs should also target environmental risk factors that might exacerbate the development of disordered gambling in at-risk individuals, such as exposure to pro-gambling norms, either within or outside the family. Finally, they should be implemented at an early stage of a person’s life (i.e., by the end of elementary school) before attitudes and behaviors become ingrained. Considering the particularities of this pathway, clinicians accustomed to working with oppositional and delinquent adolescents are preferred for these types of interventions.

CONCLUSION

We now understand that a GD does not always develop independently of other clinical disorders. For the Emotionally and Biologically Vulnerable pathways, various pre-occurring clinical conditions lead to the emergence of a GD. Therefore, in order to prevent a significant proportion of GD, is it necessary to intervene clinically on other aspects (e.g., internalizing or impulse-control disorders). Ever since GD has been integrated to Substance Use Disorders (SUD) in the DSM-5, it has become increasingly clear that prevention practices for gambling problems can find inspiration in programs that have been developed and validated for SUD. Universal prevention programs aimed at addressing gambling problems are doomed to fail for a large proportion of at-risk problem gamblers if they are administered alone. It is therefore crucial to implement targeted programs that seek out groups which fit into one of the three pathways described by the Pathways Model. The use of a differential approach to prevention has shown to be successful in addressing SUD, which is why we believe it is now time to apply the same method to GD.

Researchers and clinicians who wish to implement and evaluate an intervention program structured around the Pathways Model may not only increase their probability of effectively reducing the incidence of GD, but may also generate additional empirical validation of the model by testing its basic tenants. For instance, targeted prevention methods addressing impulsive and delinquent characteristics are expected to demonstrate greater effect sizes among the Biologically Vulnerable subset of youth (i.e., screened for existing impulsive and delinquent traits), compared to the Emotionally Vulnerable or Behaviorally Conditioned subset. The same goes for targeted prevention methods directed at internalized symptoms, and their expected effect on the Emotionally Vulnerable subset of participants. Including and testing for relevant mediating factors that are specific to each pathway would reinforce the case for differentiated prevention approach, and by extension, the Pathways Model in which it finds its roots.

REFERENCES


CPGI-Population Harm: A Supplement to the Canadian Problem Gambling Index

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ABSTRACT

Objectives: The majority of measures of gambling problems focus only on problems of the individual gambler. The aim of the present study was to develop and validate a supplement for the Canadian Problem Gambling Index (CPGI) to assess the impact of gambling problems at the population level (e.g., family, community, and other environmental levels such as work). Methods: An initial pool of items was generated through a systematic review of empirical literature and clinical instrumentation; the item set was revised based on classical test theory in a large sample with varying levels of gambling behaviour. A total of 317 adults (mean age=42.13, SD=13.21) were recruited for the present study: 256 participants from across Canada were recruited from an online survey panel (Sample 1), and 61 participants from Toronto were recruited from a previous gambling study (Sample 2). Participants completed population harm items along with other measures of problem gambling (CPGI Problem Gambling Severity Index, South Oaks Gambling Screen, Harmful Consequences Questionnaire), and disability and quality of life (Sheehan Disability Scale, Quality of Life Inventory). Sample 2 completed the population harm items a second time one week later. Results: The CPGI-Population Harm demonstrated internal consistency and test-retest reliability, and a unifactorial structure. Evidence further supported its convergent and discriminant validity. Conclusions: The CPGI-Population Harm appears to be an efficient tool to assess gambling-related harm to family members, romantic partners, friends, the workplace and the community.

KEYWORDS: Gambling; Harm; Measurement

Mots-clés : Jeu de hasard et d’argent, méfait, mesures

Gambling difficulties cause substantial harm within the population, not only to individual gamblers but also to significant others such as romantic partners, family members, friends and colleagues, as well as the community at large\(^a\). A number of self-report measures have been developed to assess the severity of gambling difficulties (e.g.,\(^a,\(^b\)). However, a limitation of existing measures is their focus on the problems of the individual gambler and relative neglect of the potential harm to others.

The contemporary assessment of gambling difficulties has been shaped predominantly by two perspectives: the
medical or disease model and the public health or social model. The medical model defines gambling disorder or pathological gambling as an addiction, characterized by symptoms such as a preoccupation with gambling and unsuccessful attempts to reduce or manage gambling. The South Oaks Gambling Screen (SOGS)\(^8\) is a self-report measure specifically designed to assess pathological gambling severity in a clinical context and is the most widely used measure of gambling difficulties\(^8,9\).

In contrast, the public health model defines problem gambling more broadly as gambling behaviour that is harmful to an individual gambler, his or her family, or the community at large\(^9\). The CPGI is a self-report instrument designed to assess the harmful consequences of gambling behaviour for the individual gambler as well as his or her social network and community\(^5\). A number of concerns have been raised regarding the item content of the CPGI, however (e.g.,\(^1\)). In particular, the majority of the CPGI items were adapted from the SOGS or from pathological gambling diagnostic criteria and thus reflect symptom-based features rather than the broad gambling-related harm emphasized by the public health model. As such, the CPGI in its current form does not adequately assess gambling-related harm to society\(^5\). Indeed, the broader social consequences of individual gambling difficulties are evaluated through only one CPGI item\(^1\).

THE CURRENT INVESTIGATION

Although assessment instruments such as the CPGI and SOGS provide valuable information regarding individual gamblers, their behaviours and monetary losses, there are currently no gambling instruments that adequately assess the adverse effects of gambling on the environment— including family, friends, neighbours, colleagues, and communities, across health, social, economic, and cultural domains\(^9\). In the current investigation, we developed and tested the psychometric properties of a supplement to the CPGI that provides such an assessment of the harmful effects of gambling that extend beyond the individual gambler: the CPGI-Population Harm. A pool of items was generated based on a systematic review of empirical literature and clinical instrumentation, as well as consultation with multidisciplinary staff engaged in gambling-related research, clinical practice and policy development. The psychometric properties of the population harm items were then evaluated to produce a novel scale using a classical test theory approach\(^13,14\).

METHOD

Participants. A total of 317 participants completed study protocol. Two subsamples were collected to ensure variation in demographic features and gambling behaviour in the total sample. Sample 1 consisted of 256 adults (126 men, 130 women) from ResearchNow, an online survey panel of respondents across Canada. Participants were selected to be nationally representative in terms of age (ranging from 18 to 65 years; mean age \(= 42.63 \text{ years} \quad [\text{SD} = 13.23]\)) and residence (37% Ontario, 23% Quebec, 30% Western provinces, 10% Atlantic provinces). Sample 2 consisted of 61 adults (34 men, 27 women) who previously participated in a clinical research study investigating the association between personality and gambling. Participants ranged in age from 20 to 63 years (mean age=40.03 \([\text{SD}=13.03]\)) and resided in Ontario. Sample 2 completed the CPGI-Population Harm items on a second occasion one week later to evaluate test-retest reliability.

Item Development. Item content was generated based on an extensive review of empirical literature and clinical instrumentation across the domains of gambling and gaming, impulse control and addiction, and public health. Empirical literature pertaining to identified harm to others and the community associated with diverse forms of impulsive and addictive behaviour (e.g., drug and alcohol use) was obtained from a review of PsycINFO and Medline keyword searches including “public health model,” “social model,” “population harm,” “addiction,” and “gambling.” Articles published in English over the past 20 years were considered. This review identified the following domains of harm to be of theoretical and clinical importance: family, romantic partners, friends, work, and community (c.f.\(^16\)). Due to the low prevalence of illegal acts to support gambling involvement in those with gambling difficulties, which supported the removal of this diagnostic criterion within the new diagnostic manual\(^7\), legal consequences of gambling were not included in the item pool. Items were generated based upon this review as well as adapted from existing, related measures (e.g.,\(^17\)). Consistent with the CPGI Problem Gambling Severity Index (PGSI), items were rated on a four-point Likert scale from 0 (Disagree) to 3 (Strongly Agree); item anchors reflect degree of agreement as many items referred to difficulties that were not discrete events and therefore difficult to judge in terms of frequency.
The Problem Gambling Institute of Ontario (PGIO), a multidisciplinary organization of staff expert in the areas of clinical practice, policy, prevention, and education, was further consulted for stakeholder comments and recommendations regarding scale format and content. It was a particular recommendation of this organization that the initial item pool include both items with direct reference to gambling and those without (e.g., “Has your gambling caused problems for your family?” versus “Have you experienced a loss of productivity at work/school?”), as respondent insight into the impact of their gambling behaviour is likely to be variable and a barrier to the accurate assessment of population harm. Although items without a direct reference to gambling may assess difficulties arising from a variety of sources in addition to or instead of gambling, the unanimous feedback was that items not requiring respondents to be aware of and willing to concede the impact of their gambling would be beneficial to ensure the valid assessment of gambling-related harm. A pool of 39 items was then administered to study participants with other self-report measures described below.

MEASURES

**Canadian Problem Gambling Questionnaire (CPGI).**
The CPGI is a 31-item self-report measure for assessing gambling difficulties, behaviour, and correlates. A subset of nine items known as the PGSI provides a quantitative index of problem gambling. The PGSI total score ranges from 0 to 27 and a cut-point of eight or more is used to generate a prevalence estimate for problem gambling. Recently, a cut-point of three or more has been utilized to classify problem gambling. The PGSI has demonstrated high levels of internal consistency reliability and validity. The internal consistency of the PGSI in this sample was high (α=.95).

**South Oaks Gambling Screen (SOGS).** The SOGS is a 16-item self-report screening instrument for pathological gambling that has demonstrated strong construct validity. The SOGS was designed to assess gambling pathology in a clinical context, and is the most frequently used measure of gambling worldwide. The total score ranges from 0 to 20, and a cut-point of five is used to differentiate probable pathological gamblers from non-pathological gamblers. The prevalence rates for problem gambling produced by the SOGS are congruent with the rates obtained by the CPGI. The internal consistency of the SOGS in this sample was high (α=.90).

**Harmful Consequences Questionnaire (HCQ).** The HCQ is a 12-item self-report measure of gambling-related harm to self and others. Individuals rate the extent to which gambling causes problems in various areas of functioning (e.g., physical and mental health, social relationships, work, finances). The total score ranges from 0 to 30. The psychometric properties of the HCQ have received limited empirical attention; however, this measure has been successfully utilized in gambling research. The internal consistency of the HCQ in this sample was high (α=.98).

**Sheehan Disability Scale (SDS).** The SDS is a brief self-report instrument of impairment secondary to general emotional difficulties in three domains: work/school, social life/leisure activities, and family life/home responsibilities. Individuals are asked to rate the extent to which each domain is impaired by emotional symptoms. The three items can be summed into a single dimensional measure of global functional impairment that ranges from 0 (unimpaired) to 30 (impaired). Studies have found the SDS to possess adequate reliability and validity. The internal consistency of the SDS in this sample was high (α=.89).

**Quality of Life Inventory (QOLI).** The QOLI is a 32-item self-report measure of life satisfaction across 16 domains. Respondents rate the perceived importance of each domain to their overall happiness and the degree of satisfaction they have with that particular domain. Overall quality of life is calculated by multiplying perceived importance by satisfaction within each domain, and summing these product terms to obtain an overall score that ranges from -96 to +96. Numerous studies have determined that the QOLI possesses high levels of reliability and validity in various samples. The internal consistency of the product terms in this sample was high (α=.89).

**SCALE DEVELOPMENT & DATA ANALYSES**

**Item Selection.** The psychometric properties of the CPGI-Population Harm were evaluated using a classical test theory approach, with Internal Scale and Item Reliability Analysis (ISIRA;13, 14). ISIRA analyses include Cronbach’s alpha (α), the corrected item-to-total correlation (CITC), and the average corrected item-to-total correlation (AIC). Item variances and frequency of response option distribution were also examined. Item analysis and selection proceeded in the following fashion: First, item variances and response option distributions were examined. Next, exploratory factor analysis was conducted to identify relevant factors. CITCs were calculated for items on the identified factors and then the item-factor loadings were examined for each item with the total score from its corresponding factor. The items with the factor loadings > .30 and CITCs > .25 were retained. The goal of this set of analyses was to maximize the internal consistency for...
each of the factors. A second factor analysis was conducted to evaluate the structure of the final, reduced scale.

For both factor analyses, parallel analysis was utilized to determine how many factors to extract. Parallel analysis involves the comparison of eigenvalues from a factor analysis of the actual data with eigenvalues from a factor analysis of a random dataset; the number of factors to retain is based on the number of actual data eigenvalues greater in size than random data eigenvalues. This empirical method has been demonstrated to be superior to other retention guidelines. Due to the nonnormal distributional properties of the CPGI-Population Harm items, 1000 randomly generated permutations of the existing data set were utilized. Consistent with the recommendations, we compared actual data eigenvalues with the 95th percentile eigenvalues in the random data. Factor analyses were then conducted within MPlus, utilizing unweighted least squares estimation.

**Internal Consistency.** CITCs and AICs for the full set of items and the identified factors were calculated. Cronbach’s α coefficients were also computed for the total scale and each factor. Items with CITCs >.25 with their corresponding factor and < .10 with non-corresponding factor scores were retained. The goal was to obtain factors with a Cronbach’s α > .70 and an AIC of > .40 (but < .50, which reflects item content redundancy) and a total scale Cronbach’s α of > .80 and AICs > .15 but < .50, which reflects item redundancy.

**Test-Retest Reliability.** Intraclass coefficient (ICC) was used to evaluate the test-retest reliability of the CPGI-Population Harm across one week within Sample 2 (n=61), with estimates > .70 considered to represent adequate test-retest reliability.

**Convergent and Discriminant Validity.** To evaluate convergent validity, we examined the association between the CPGI-Population Harm and the PGSI, the SOGS and the HCQ using Pearson’s product-moment correlation coefficients. To evaluate discriminant validity, Pearson’s correlations between the CPGI-Population Harm and the SDS and QOLI were evaluated.

**RESULTS**

*Sample Descriptives.* Means and standard deviations of the PGSI, SOGS, HCQ, SDS, and QOLI are displayed in Table 1. Age of first gambling experience, average number of days gambled per month over the past 12 months, and average amount of money spent on gambling per month over the past 12 months are also displayed. Sample differences were evaluated via t-tests and supplemented with effect size estimates (i.e., Cohen’s d), with d values of .10, .30, .50, reflecting small, medium and large effect sizes, respectively. Sample 2 endorsed significantly greater gambling frequency and expenditures, as well as greater gambling pathology and associated harm. Samples 1 and 2 did not differ significantly in age of first gambling experience, and the two samples endorsed comparable levels of quality of life. Sample 1 and 2 did not differ significantly in gender (c²=.84, p=.39) or age (t=1.38, p=.17, d=.20).

**Item Selection.** Items were initially removed from consideration on rational and empirical grounds (e.g., missing data, item distribution properties). The 24 items remaining after initial item deletion have a 2-factor structure according to a parallel analysis. The first three eigenvalues from the actual data were 14.36, 2.10 and 1.25, the corresponding first three 95th percentile random data eigenvalues were 1.92, 1.74, and 1.63. The factor loadings derived from an exploratory factor analysis of these 24 items can be found in Table 2. Factors 1 and 2 consist of gambling-related harm versus non-gambling-related harm; these factors were correlated at .63.

As item structure appeared to reflect item format (i.e., presence or absence of direct reference to gambling) rather than domain of harm, these factors were not interpreted to represent substantive domains of population harm. Item endorsement and skew were reviewed and utilized to direct the choice of two items per domain of harm, including both a gambling-related and a non-gambling-related indicator of harm. The CPGI-Population Harm finally included 10 items.

The CPGI-Population Harm has a unifactorial structure according to a parallel analysis. The first two eigenvalues from the actual data were 6.13 and 1.00; the corresponding first two 95th percentile random data eigenvalues were 1.52 and 1.35. The factor loadings derived from an exploratory factor analysis specifying one factor and utilizing unweighted least squares estimation can be found in Table 3.

The CPGI-Population Harm descriptive statistics for the current sample are: total $M=2.72$, $SD=4.72$; Sample $1 \ M=2.25$, $SD=4.20$; Sample $2 \ M=4.77$, $SD=5.91$. Similar to the other gambling measures, the mean CPGI-Population Harm total score was significantly greater in Sample 2 as compared to Sample 1, $t=3.11$, $p<.01$, $d=.55$. 
CPGI-Population Harm total scores were higher in males ($M=3.43$, $SD=5.47$) as compared to females ($M=2.10$, $SD=3.64$; $t=2.44$, $p=.02$, $d=.28$), and were modestly negatively correlated with age, $r=-.16$, $p<.01$.

**Internal Consistency.** Item CITCs are displayed in Table 3. CPGI-Population Harm item CITCs were all $> .25$. CPGI-Population Harm total scale coefficient $a$ was .92, providing further evidence for internal consistency. CPGI-Population Harm item AIC was .56, greater than .15 but also greater than .50, indicative of potential item redundancy.

**Test-Retest Reliability.** Test-retest reliability estimates for Sample 2 are displayed in Table 4. The CPGI-Population Harm total scale score and item scores were all above established cut-offs, indicative of adequate test-retest reliability.

**Convergent and Discriminant Validity.** The CPGI-Population Harm was strongly correlated with each gambling measure (see Table 5): PGSI $r=.77$; SOGS $r=.65$; HCQ $r=.76$, all $p<.01$. The CPGI-Population Harm was also significantly associated with quality of life and disability measures, but to a lesser degree: QOLI $r=-.35$, SDS $r=.56$, all $p<.01$. The CPGI-Population Harm was also significantly associated with the average number of days participants gambled per month ($r=.17$, $p<.01$) and the average amount of money participants gambled per month ($r=.19$, $p<.01$).

**DISCUSSION**

The purpose of the present study was to develop a supplement to the CPGI in order to better assess gambling-related harm to others. A review of the literature highlighted the centrality of gambling-related harm to family members, romantic partners, friends, the workplace, and the community within such a supplement. Expert consultation suggested respondent insight into the harm resulting from their gambling behaviour could be a significant barrier to accurate assessment. Items were therefore generated to include items with and without reference to gambling specifically. Results suggest that the newly developed CPGI-Population Harm provides an efficient tool for the assessment of harm resulting from gambling that extends beyond the individual gambler.

The internal consistency of the CPGI-Population Harm was highly satisfactory. One index was suggestive of item redundancy; however, some degree of item redundancy is expected as each domain of harm is represented by both a direct and indirect item. The test-retest reliability of the total scale and item scores were also high, suggesting that the CPGI-Population Harm is reliable across short durations. The CPGI-Population Harm demonstrated a unifactorial structure, and strong associations with measures of gambling difficulties and pathology, and harmful consequences of gambling to gamblers and others were observed. The CPGI-Population Harm also demonstrated significant, but lesser, associations with gambling behaviours (monthly time and money expenditures, age of onset) as well as general measures of quality of life and disability. Although these results require replication, they provide initial evidence for the reliability and validity of the CPGI-Population Harm.

The CPGI was developed from a public health perspective; however, the commonly used PGSI consists largely of pathological gambling symptoms reflective of the medical model. Although a variety of measures include items assessing population harm secondary to alcohol use, such measures and items are relatively rare within gaming and gambling. The measures that do exist within the gambling field have various features that may reduce their utility. Namely, measures consist of (1) items assessing harm to the individual gamblers and to others (e.g., the HCQ); (2) items assessing diagnostic criteria of pathological gambling (e.g., PGSI); and/or (3) item format or scale length rendering use within epidemiological studies limited (e.g.,$^{38}$). The CPGI-Population Harm is thus unique in its content and format, and specifically geared to be of broad utility.

The initial item pool of the CPGI-Population Harm scale incorporated items without direct reference to gambling due to unanimous expert feedback that respondent insight would form a major barrier to accurate assessment. Items without direct reference to gambling, however, may assess difficulties arising from a variety of sources. The empirical association of these items with measures of problem or pathological gambling as well as gambling behaviour supported their inclusion in the final measure. It may be preferable for investigators to include other sources of these difficulties to preclude confounds critical to their specific research questions and to ensure the CPGI-Population Harm predicts over and above these sources. The psychometric properties of a truncated version of the CPGI-Population Harm with only gambling-related items were equivalent to the full scale (see Table 2, items 3, 4, 7, 10, and 23). Until any psychometric or other advantage is demonstrated, the choice between the 10-item versus the 5-item CPGI-Population Harm should be made on the basis of logistical and clinical considerations (e.g., time, insight).

The current study utilized web-based survey administration. Online administration of questionnaires has been empirically demonstrated not to decrease the reliability or validity of measures administered$^{39}$. The addition of a second local sample ensured the recruitment of a sample wide range of gambling involvement, including
involvement likely to be associated with harm⁴⁶. The current study has some other limitations that should be acknowledged, however. First, some demographic information (e.g., ethnicity, marital status) and clinical features (e.g., family psychiatric history, treatment history) were not obtained, which precluded investigation of the covariation of these features with gambling harms to others. Second, both samples volunteered to participate in the research protocols, and so may differ from the general population in terms of personality features. For example, Sample 2 was comprised of adults who responded to print advertisements for a study of “personality and gambling.” Participants in Sample 2 may therefore have a particular interest in gambling, as reflected by their greater gambling involvement and pathology. Yet, this large, heterogeneous sample allowed for sufficient variability across the range of possible item scores, and an opportunity to evaluate stability over time. Finally, test-retest reliability was only evaluated within Sample 2; yet, this sample size exhibited a wide range of gambling involvement and appeared sufficient to provide an estimate of temporal stability⁴⁷.

REFERENCES


40. Quilty LC, Avila Murati D, Bagby RM. Identifying indicators of harmful and problem gambling in a Canadian sample through receiver operating characteristic analysis. Psychol Addict Behav 2014;8:229-37.


FOOTNOTES

† In consideration of the fact that the alternate sources of harm that may contribute to the indirect items of the CPGI-Population Harm may prove a significant confound for some clinicians and researchers, we evaluated the psychometric properties of a truncated 5-item scale including only items with a direct reference to gambling. The CPGI-Population Harm was correlated with the truncated 5-item scale (r = .93, p < .01). Similar to the full scale, the CPGI-Population Harm (5 item) also demonstrated a unifactorial structure: the first two eigenvalues from the actual data were 4.73 and .57; the corresponding first two 95th percentile random data eigenvalues were 1.27 and 1.15. Factor loadings were .89 (item 3), .94 (item 4), .92 (item 7), .69 (item 10), and .82 (item 23). The mean CPGI-Population Harm (5 item) total score was significantly greater in Sample 2 as compared to Sample 1, t = 2.06, p = .04, d = .37. The CPGI-Population Harm (5 item) also exhibited adequate levels of internal reliability (CITCs > .67; coefficient a = .92; AIC = .72) and one-week test-retest stability (ICC = .91). The CPGI-Population Harm (5 item) finally demonstrated similar convergent and discriminant validity to the full scale: PGSI r = .81, p < .01, SOGS r = .69, p < .01, HQC r = .80, p < .01, QOLI r = -.24, p < .01, SDS r = .47, p < .01, gambling days/month r = .21, p < .01, and gambling expenditures/month r = .22, p < .01.
TABLE 1. Means and Standard Deviations of Gambling, Quality of Life, and Disability Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Total Sample M (SD)</th>
<th>Sample 1 (n = 256) M (SD)</th>
<th>Sample 2 (n = 61) M (SD)</th>
<th>t (p)</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>PGSI</td>
<td>2.42 (4.62)</td>
<td>1.70 (3.88)</td>
<td>5.46 (6.08)</td>
<td>4.62 &lt;.01</td>
<td>.86</td>
</tr>
<tr>
<td>SOGS</td>
<td>3.54 (5.19)</td>
<td>2.71 (4.34)</td>
<td>7.02 (6.83)</td>
<td>4.78 &lt;.01</td>
<td>.88</td>
</tr>
<tr>
<td>HCQ</td>
<td>7.45 (15.49)</td>
<td>5.78 (13.48)</td>
<td>14.60 (20.77)</td>
<td>3.14 &lt;.01</td>
<td>.58</td>
</tr>
<tr>
<td>Days/Month</td>
<td>11.72 (44.74)</td>
<td>7.38 (20.58)</td>
<td>31.19 (93.54)</td>
<td>1.91 (.06)</td>
<td>.53</td>
</tr>
<tr>
<td>Money/Month</td>
<td>420.23 (2899.69)</td>
<td>225.59 (743.42)</td>
<td>1264.78 (6465.96)</td>
<td>1.23 (.23)</td>
<td>.36</td>
</tr>
<tr>
<td>First Gambled</td>
<td>19.60 (9.49)</td>
<td>19.79 (9.70)</td>
<td>18.82 (8.55)</td>
<td>.70 (.48)</td>
<td>.10</td>
</tr>
<tr>
<td>QOLI</td>
<td>28.54 (27.87)</td>
<td>29.75 (26.28)</td>
<td>23.05 (33.95)</td>
<td>1.37 (.17)</td>
<td>.24</td>
</tr>
<tr>
<td>SDS</td>
<td>6.64 (7.74)</td>
<td>6.22 (7.41)</td>
<td>8.44 (8.91)</td>
<td>1.78 (.08)</td>
<td>.29</td>
</tr>
</tbody>
</table>

Note: PGSI = Problem Gambling Severity Index; SOGS = South Oaks Gambling Screen; HCQ = Harm Consequences Questionnaire; Days/Month = Number of days participant gambles per month over the past 12 months; Money/Month = Amount of money ($) participant spends on gambling per month over the past 12 months; First Gambled = Age participant first gambled; QOLI = Quality of Life Inventory; SDS = Sheehan Disability Scale

TABLE 2. Factor Loadings of Two-Factor Structure of Initial Item Pool

<table>
<thead>
<tr>
<th>Item</th>
<th>F1</th>
<th>F2</th>
</tr>
</thead>
<tbody>
<tr>
<td>21. Have you felt that your family is being harmed by your gambling?</td>
<td>.92</td>
<td>.01</td>
</tr>
<tr>
<td>2. When you gambled, did it hurt your family in some way?</td>
<td>.90</td>
<td>-.02</td>
</tr>
<tr>
<td>*3. Has your gambling made things more difficult for your partner?</td>
<td>.88</td>
<td>.02</td>
</tr>
<tr>
<td>*7. Has your gambling caused problems for your family?</td>
<td>.88</td>
<td>.03</td>
</tr>
<tr>
<td>39. Have your friends been hurt somehow from your gambling?</td>
<td>.84</td>
<td>.09</td>
</tr>
<tr>
<td>*23. Has your gambling caused problems for your friends?</td>
<td>.83</td>
<td>.02</td>
</tr>
<tr>
<td>12. Has your gambling negatively affected your romantic partner?</td>
<td>.82</td>
<td>.07</td>
</tr>
<tr>
<td>15. Have members of your community been hurt in any way from your gambling?</td>
<td>.82</td>
<td>-.02</td>
</tr>
<tr>
<td>*3. Has your gambling made things more difficult for your partner?</td>
<td>.80</td>
<td>.03</td>
</tr>
<tr>
<td>13. Do you have conflicts with friends over borrowing/lending money?</td>
<td>.68</td>
<td>.12</td>
</tr>
<tr>
<td>25. Have strangers been hurt in some way by your gambling?</td>
<td>.68</td>
<td>.02</td>
</tr>
<tr>
<td>28. Do you regularly make use of social services (e.g., legal aid, welfare)?</td>
<td>.66</td>
<td>.04</td>
</tr>
<tr>
<td>*10. Has your gambling had a negative impact on your neighbourhood?</td>
<td>.64</td>
<td>.14</td>
</tr>
<tr>
<td>38. Are you often absent from work/school?</td>
<td>.63</td>
<td>.31</td>
</tr>
<tr>
<td>24. Has your gambling caused you to be away a lot from your family?</td>
<td>.61</td>
<td>.24</td>
</tr>
<tr>
<td>31. Do you often receive negative feedback at work/school?</td>
<td>.60</td>
<td>.28</td>
</tr>
<tr>
<td>26. Have you lost a friendship or drifted away from a friend?</td>
<td>-.19</td>
<td>.83</td>
</tr>
<tr>
<td>22. Have you spent less time with your romantic partner than they prefer?</td>
<td>-.10</td>
<td>.82</td>
</tr>
<tr>
<td>36. Have you spent less time with your friends than they prefer?</td>
<td>-.02</td>
<td>.82</td>
</tr>
<tr>
<td>32. Do you often have conflicts or arguments with your romantic partner?</td>
<td>.12</td>
<td>.72</td>
</tr>
<tr>
<td>16. Have you spent less time with your family than they prefer?</td>
<td>.17</td>
<td>.70</td>
</tr>
<tr>
<td>8. Are there problems with your romantic relationship?</td>
<td>.15</td>
<td>.61</td>
</tr>
<tr>
<td>35. Do you frequently have conflicts or disagreements with your family?</td>
<td>.29</td>
<td>.52</td>
</tr>
<tr>
<td>34. Have you experienced a loss of productivity at work/school?</td>
<td>-.44</td>
<td>-.51</td>
</tr>
</tbody>
</table>

Note: F1 = Factor 1, F2 = Factor 2. All factor loadings > .40 in bold.
*CGPI-Population Harm – 5 item truncated version
### TABLE 3. CPGI-Population Harm Item Corrected Item-total Correlations and Factor Loadings

<table>
<thead>
<tr>
<th>Item</th>
<th>CITC</th>
<th>Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has your gambling made things more difficult for your partner?</td>
<td>.79</td>
<td>.84</td>
</tr>
<tr>
<td>Has your gambling in any way negatively affected people at work?</td>
<td>.84</td>
<td>.89</td>
</tr>
<tr>
<td>Has your gambling caused problems for your family?</td>
<td>.83</td>
<td>.88</td>
</tr>
<tr>
<td>Are there problems with your romantic relationship?</td>
<td>.64</td>
<td>.66</td>
</tr>
<tr>
<td>Has your gambling had a negative impact on your neighbourhood?</td>
<td>.70</td>
<td>.73</td>
</tr>
<tr>
<td>Has your gambling caused problems for your friends?</td>
<td>.76</td>
<td>.81</td>
</tr>
<tr>
<td>Do you regularly make use of social services (e.g., legal aid, welfare)?</td>
<td>.56</td>
<td>.60</td>
</tr>
<tr>
<td>Have you experienced a loss of productivity at work/school?</td>
<td>.81</td>
<td>.82</td>
</tr>
<tr>
<td>Do you frequently have conflicts or disagreements with your family?</td>
<td>.66</td>
<td>.67</td>
</tr>
<tr>
<td>Have you spent less time with your friends than they prefer?</td>
<td>.60</td>
<td>.61</td>
</tr>
</tbody>
</table>

Note: CITC = Corrected item-total correlation

### TABLE 4. Sample 2 CPGI-Population Harm Item and Total One-Week Test-Retest Reliability

<table>
<thead>
<tr>
<th>Item</th>
<th>ICC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has your gambling made things more difficult for your partner?</td>
<td>.87**</td>
</tr>
<tr>
<td>Has your gambling in any way negatively affected people at work?</td>
<td>.75**</td>
</tr>
<tr>
<td>Has your gambling caused problems for your family?</td>
<td>.83**</td>
</tr>
<tr>
<td>Are there problems with your romantic relationship?</td>
<td>.83**</td>
</tr>
<tr>
<td>Has your gambling had a negative impact on your neighbourhood?</td>
<td>.60**</td>
</tr>
<tr>
<td>Has your gambling caused problems for your friends?</td>
<td>.85**</td>
</tr>
<tr>
<td>Do you regularly make use of social services (e.g., legal aid, welfare)?</td>
<td>.82**</td>
</tr>
<tr>
<td>Have you experienced a loss of productivity at work/school?</td>
<td>.89**</td>
</tr>
<tr>
<td>Do you frequently have conflicts or disagreements with your family?</td>
<td>.62**</td>
</tr>
<tr>
<td>Have you spent less time with your friends than they prefer?</td>
<td>.76**</td>
</tr>
</tbody>
</table>

CPGI-Population Harm Total .93**

Note: ICC = Intraclass correlation coefficient; ** signifies p < .01.

### TABLE 5. Correlations among CPGI-Population Harm, Gambling, Quality of Life, and Disability Measures

<table>
<thead>
<tr>
<th></th>
<th>CPGI-PH</th>
<th>PGSI</th>
<th>SOGS</th>
<th>HCQ</th>
<th>QOLI</th>
<th>SDS</th>
<th>Days/Month</th>
<th>Money/Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPGI-PH</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PGSI</td>
<td>.77**</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOGS</td>
<td>.65**</td>
<td>.84**</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HCQ</td>
<td>.76**</td>
<td>.85**</td>
<td>.80**</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>QOLI</td>
<td>-.35**</td>
<td>-.26**</td>
<td>-.27**</td>
<td>-.31**</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDS</td>
<td>.56**</td>
<td>.43**</td>
<td>.37**</td>
<td>-.51**</td>
<td>-.42**</td>
<td>-.16**</td>
<td>.09</td>
<td>--</td>
</tr>
<tr>
<td>Days/Month</td>
<td>.17**</td>
<td>.29**</td>
<td>.28**</td>
<td>.24**</td>
<td>-.16**</td>
<td>-.09</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>Money/Month</td>
<td>.20**</td>
<td>.24**</td>
<td>.27**</td>
<td>.30**</td>
<td>-.09</td>
<td>.14**</td>
<td>.04</td>
<td>--</td>
</tr>
<tr>
<td>First Gambled</td>
<td>-.06</td>
<td>-.02</td>
<td>.03</td>
<td>.01</td>
<td>.03</td>
<td>-.12*</td>
<td>-.03</td>
<td>.01</td>
</tr>
</tbody>
</table>

Note: CPGI-PH = CPGI-Population Harm; PGSI = Problem Gambling Severity Index; SOGS = South Oaks Gambling Screen; HCQ = Harm Consequences Questionnaire; QOLI = Quality of Life Inventory; SDS = Sheehan Disability Scale; Days/Month = Number of days participant gambles per month over the past 12 months; Money/Month = Amount of money ($) participant spends on gambling per month over the past 12 months; First Gambled = Age participant first gambled; * signifies p < .05; ** signifies p < .01.
Brief Interventions for Disordered Gambling

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ABSTRACT

Research into effective treatment options for disordered gamblers has grown substantially over the past decade. Low rates of treatment seeking combined with the capacity for many disordered gamblers to recover without formal treatment highlight the importance of offering treatment options on a continuum of intensity. Minimal and brief interventions reflect effective ways to reach gamblers not seeking treatment and facilitate the natural recovery process. Further, minimal and brief interventions consolidate well with proposed stepped-care models of treatment for this population. Here we review several specific self-directed materials and brief interventions as well as available empirical support to date. We discuss the ongoing role of technology for adapting and providing a suitable platform for these tools, as well as specific considerations and future directions for this growing area of research. Overall, brief interventions represent a promising way to reach the majority of disordered gamblers not seeking treatment and to facilitate the recovery process.

Keywords: gambling, disordered gambling, brief intervention, self-help, motivational interviewing

Research examining effective treatments for disordered gambling has grown considerably over the past decade. Indeed, given the associated consequences of disordered gambling, further investigation into effective treatments for this population is warranted. However, rates of treatment-seeking among lifetime disordered gamblers are typically quite low. For example, U.S. population-based surveys indicate that fewer than 10% of respondents who reported a lifetime prevalence of disordered gambling had ever sought formal treatment. Canadian-based survey data found slightly higher rates (around 18%) compared to other North American surveys, but these results still indicate that the vast majority of disordered gamblers are not seeking formal help for their problem. In a review of studies examining barriers to treatment-seeking among gamblers, the most commonly reported barriers included a desire to handle the problem themselves; shame, stigma, or embarrassment; and minimization of the actual problem or its severity. Notably, the actual availability of treatment was not highly endorsed as a barrier. Thus, it appears that in addition to the development of efficacious treatments for disordered gamblers, other important obstacles must be considered in order to effectively reach this population.
Even with such low rates of treatment-seeking, population surveys do indicate relatively high rates of recovery. Comparing lifetime and past-year prevalence rates of disordered gambling yields a difference of about one-third, suggesting that this many may be classified as recovered. As such, it appears likely that not all disordered gamblers require formal treatment to recover. Furthermore, while yearly prevalence rates of disordered gambling appear fairly stable, individual incidences of the disorder may be more transitory and episodic. Together, these data suggest a natural recovery process is taking place (also referred to as self-change or self-recovery). The severity of problem appears to be an important factor in this process, such that gamblers with more severe problems are more likely to seek formal treatment while those experiencing less severe problems are more likely to engage in natural recovery. Although the term natural recovery might seem to imply a latent process, interviews conducted with naturally recovered gamblers indicate that for the majority (65%), the decision to make changes to their gambling behaviour was completely conscious. Further, respondents described using practical and behaviour-focused strategies in their recovery. However, it is still likely that a subset of gamblers that do require help with their problem are not accessing services. Even for gamblers able to recover on their own, the natural recovery process can be facilitated to improve outcome. Brief interventions are one way to accomplish these tasks.

Brief interventions typically involve the provision of self-directed materials or interventions with limited client contact. As such, this approach represents an accessible and potentially non-threatening alternative for individuals not seeking formal treatment. Brief interventions are also a prime candidate for use in stepped-care models of disordered gambling, which require interventions spanning a continuum of intensity. Individuals move from the least intrusive option (e.g., self-change) to minimal or brief treatments (e.g., self-help, brief interventions), to higher intensity treatments upon failure of a less intrusive intervention. This model of stepped-care for disordered gamblers requires empirically supported interventions to span this continuum. Minimal and brief interventions developed for use with disordered gamblers range the provision of self-directed materials, to 10 minutes of brief advice, to single-session motivational interventions. In this paper, we will review specific minimal and brief interventions, discuss the role of technology and Internet-based adaptations of these materials, and provide important considerations, limitations, and future directions for this developing area of research.

**SELF-DIRECTED INTERVENTIONS**

Self-help materials are widely available for many different psychological problems. Indeed, among disordered gamblers who do seek additional support for their problem, self-help materials are the most frequently accessed form of help. Self-help interventions encompass a wide range of materials, ranging from written materials (e.g., self-help books and treatment manuals), to audio and video materials, and Internet-based self-help interventions (described in a later section of this paper). Many of these options are readily available to individuals seeking helpful materials, however not all of these materials have been empirically evaluated, and so the benefits (or potential iatrogenic effects) of such materials remains unknown. Developing and testing self-directed interventions is essential to maximize gains and facilitate the natural recovery process. Research examining self-help for disordered gambling is considerably underdeveloped compared to other psychological problems. In this section, we briefly review three self-directed interventions comprised of written materials and developed for disordered gamblers. Some of the interventions discussed here have been subsequently developed for use online, however Internet-based interventions are covered in a later section of this paper.

As previously discussed, naturally recovered gamblers often report utilizing specific strategies to aid in their recovery. The techniques identified by recovered gamblers in this descriptive study of the recovery process provided a starting point for the development of a self-help workbook (*Becoming a Winner: Defeating Problem Gambling*). In addition to the strategies reported by naturally recovered gamblers, this self-help workbook is based on a cognitive-behavioural model and relapse prevention techniques. Cognitive-behavioural therapy (CBT) targets maladaptive behavioural associations and erroneous cognitions, and has demonstrated efficacy as a treatment for disordered gambling in its traditional format. The workbook includes specific sections on self-assessment (increasing awareness of precipitating situations and consequences of gambling behaviour), goal setting (decisional balance of costs and benefits, followed by specification of a goal of either abstinence or controlled gambling), strategies (cognitive restructuring, dealing with urges, stimulus control), maintenance (prepare for preventing and coping with relapse), and other resources to access if additional help is needed. This particular workbook has been evaluated in three separate controlled trials. Since these studies evaluated the workbook provided alone and in conjunction with a brief motivational intervention, these studies are described in more detail in following section of this
A second self-help toolkit (Your First Step to Change: Gambling)\textsuperscript{21} includes material based on a composite of inoculation theory, stages of change, and relapse prevention. The toolkit was developed to provide information and build motivation for change. In a randomized multisite trial\textsuperscript{21} to examine efficacy, the authors assigned gamblers to receive the toolkit alone, the toolkit with additional minimal guidance (a five-minute telephone contact providing additional detail on the toolkit sections), or to a waiting-list control group. Participants in all three conditions reported significant improvement in their gambling behaviour over the 3-month follow-up. The authors noted patterns of improvements in the hypothesized direction (i.e., better outcomes among toolkit recipients), although no statistically significant differences were observed between the groups. While the results do not indicate a significant advantage over no treatment, the toolkit did not appear to interfere with the recovery process, and was well accepted by participants.\textsuperscript{21}

Another approach that has been adapted for self-directed provision utilizes personalized normative feedback summaries. This method has been found effective for other addictive behaviours,\textsuperscript{23} and positioned to be highly applicable with disordered gamblers.\textsuperscript{23} From a self-help standpoint, the value with this approach comes from the brevity of administration and potential efficacy from such a minimal dose. One specific assessment and personalized normative feedback intervention for disordered gamblers (Check Your Gambling) was developed and tested in a pilot study (\(N = 61\))\textsuperscript{24} and a larger randomized trial (\(N = 209\)).\textsuperscript{25} The full Check Your Gambling intervention includes a brief assessment followed by provision of personalized and normative feedback. The brief assessment covers gambling behaviours over the past year, gambling beliefs, problem severity, and other demographic information (e.g., sex, age, income); the feedback summarizes client-reported gambling behaviours and provides normative data from Canadian men or women for each type of gambling behaviour, as well as interpreted summaries of severity scores in relation to the general population. The specific format of this intervention tested in the aforementioned randomized controlled trial (RCT)\textsuperscript{25} involved a brief telephone assessment of gambling behaviours, and a hard copy (provided via standard mail) of the feedback report. Participants were randomly assigned to one of three conditions: full feedback (i.e., both normative and personalized feedback), partial feedback (personalized feedback only), or a 6-month waiting-list control group. The partial feedback condition was included to determine if the normative feedback was the active component of the intervention. Results indicated all three conditions reduced the amount of money spent gambling over time. Although the full feedback condition was hypothesized to provide the greatest benefit, only a small benefit of the partial feedback condition was observed compared to the waiting-list control group. These results, although unexpected, do support the potential short-term limited impact of the Check Your Gambling program in some form.\textsuperscript{25}

Self-help interventions for disordered gamblers present a viable option for disordered gamblers wishing to recover on their own and show promise in aiding the natural recovery process. Limited empirical support has demonstrated these tools appear most effective when combined with some therapist contact. Brief interventions involving therapist contact are discussed in the next section.

**BRIEF MOTIVATIONAL INTERVENTIONS**

Brief motivational interventions typically incorporate principles of motivational interviewing (MI), a client-centered and collaborative therapeutic style to help clients explore and resolve ambivalence and strengthen their commitment to change.\textsuperscript{26} Miller and Rollnick\textsuperscript{27} describe four guiding principles underlying MI: 1) express empathy, 2) develop discrepancy, 3) rolling with resistance (though *resistance* is no longer the preferred term),\textsuperscript{26} and 4) supporting self-efficacy. MI has been widely disseminated and applied across numerous
mental health disorders and behaviours, including disordered gambling. In addition to MI principles, brief motivational interventions often incorporate personalized normative-based feedback in addition to MI principles; this particular combination of elements is described as motivational enhancement therapy (MET).26,27

The first randomized controlled trial (RCT) examining a motivational intervention for disordered gambling was published in 2001.9 In this study, individuals who wanted to cut down or quit gambling on their own were randomly assigned to receive a self-help workbook26 alone, receive the workbook after completing a telephone motivational intervention, or a 1-month waiting-list control. After one month, all three groups reportedly decreased their gambling. However, the motivational intervention showed significantly greater improvement across measured outcome variables (days, dollars lost, and dollars per gambling day) compared to the other two groups. Thirty-two percent of the motivational group had quit compared to 21% of the workbook only and 18% of the waiting-list control group. Improvements in both groups were maintained over the 12-month follow-up, however significant between-group differences in favour of the motivational intervention were only observed at 3 months. By the 12-month follow-up, the groups did not significantly differ: Twenty-five percent of the total sample reported being abstinent and an additional 58% were rated as improved. These results suggest that the combination of the workbook and motivational intervention can aid in gambling reduction. Furthermore, a 24-month follow-up assessment20 of both groups revealed sustained improvement: Seventy-seven percent of the total sample were rated as improved, with 37% reporting 6 months of abstinence. Although rates of 6 month abstinence did not differ between the two groups, participants who received the motivational intervention reported smaller losses, gambled fewer days, and significantly more participants were rated as improved compared to the workbook only group (54% vs. 35%, respectively) during the second year.

This protocol has been replicated and extended28 to include additional support (i.e., “booster” motivational telephone calls) over the course of study follow-up to determine if this additional support would serve to maintain the significant benefit of the combined motivational interview and workbook during follow-up. Although the booster calls did not provide benefit above the initial telephone motivational interview, the authors still found support for the short-term efficacy of the brief motivational intervention. Participants who received the motivational interview plus workbook (either the single interview or booster calls) gambled significantly fewer days over early follow-up compared to the workbook only group. By 12 months those in the workbook only group were just as likely to have decreased their gambling involvement.

The studies described above provide support that brief motivational interventions short-term benefit for disordered gamblers, even when delivered as a single session via telephone. Further support for brief motivational interventions comes from a trial28 that compared face-to-face motivational interviews with a structured control interview. Participants in both groups were also provided with a self-help workbook.26 The motivational interview demonstrated benefit over and above therapist contact: Participants in the motivational group reported spending significantly less money, gambling fewer days, and lower levels of psychological distress than participants who received the structured control interview.

Contrary to the studies discussed above, Petry and colleagues26 found little benefit for their single session MET compared to an assessment only control. In this study, participants were assigned to receive 10 minutes of brief advice, a single session MET, a single session MET plus three additional sessions of CBT, or to an assessment only control. Similar to previous studies, participants in all groups showed some improvement over the course of the study. However, it was only the group that received 10 minutes of brief advice including information about risk factors and ways to reduce the risk of developing gambling problems that reported significantly better outcomes compared to the assessment only control at 6-week follow-up. Adding three sessions of CBT to the single session of MET did produce improvements in terms of problem severity at 9-month follow-up, but only the brief advice group differed significantly in terms of the number of participants classified as recovered. The single session of MET alone did not produce significant effects on any of the measured outcomes. In a replication of this study design in a sample of college students,9 the benefits of brief advice were not as pronounced; all three interventions (brief advice, MET, MET + CBT) produced significant decreases in problem severity, days, and dollars gambled over time compared to the assessment only control group. The results of these two trials do support the idea that minimal intervention can be effective, but found little additional benefit of incorporating MI principles into the intervention.

Inconsistencies observed across studies may be a product of heterogeneity among sample characteristics, delivery mode, or even the actual manualized interventions delivered across different research groups. Recently, a meta-analysis28 of the five controlled studies described above demonstrated an overall positive, short-term
benefit for motivational interventions compared to non-motivational treatments. The long-term benefits of motivational interventions still remain unclear. This particular meta-analysis sought to determine benefit specific to the effects of MI, and thus excluded studies where comparison conditions differed in more than just the use of MI. A single-session personalized feedback session for college students delivered in an MI-consistent style produced decreased gambling frequency compared to an assessment-only control group, further demonstrating effective integration of personalized feedback and MI.

Brief motivational interventions provide numerous benefits including short duration, ease of dissemination and implementation, and represent a viable standalone or approach that can be combined with other evidence-based treatments, such as CBT. However, it should be noted that given the relatively small number of studies and noted inconsistencies in efficacy, additional research is needed, particular to determine whether beneficial effects are maintained over long-term follow-up. Nevertheless, brief motivational interventions represent one promising way to engage disordered gamblers not seeking formal treatment.

WEB-BASED INTERVENTIONS

The Internet is becoming increasingly accessible through the use of smartphones, tablets, and general computer use. The sheer accessibility and numerous advantages the Internet make this a logical expansion for treatment provision. Indeed, the Internet represented a convenient and potentially cost-effective route to follow. Individuals are not limited to a particular time of place; access can span potential geographic barriers and reach remote communities with few mental health resources available. Most importantly, web-based interventions offer additional privacy and anonymity that traditional treatment cannot and provide a unique way to overcome one of the more commonly cited barriers to seeking treatment for disordered gamblers: shame, stigma, or embarrassment. Individuals may be more likely to disclose personal or private information online rather than in-person.

Many of the minimal and brief interventions discussed thus far can, and have been, adapted for web-based delivery. Both self-help workbook content and feedback interventions have been adapted to web-based formats in some capacity. For example, the Internet-based Check Your Gambling intervention is a completely self-directed program (i.e., no therapist contact) that has been successfully accessed and utilized by disordered gamblers. In the first 15 months the website was active, 1321 completed tests were recorded. Of those accessing the website for themselves, 78% were classified as experiencing severe gambling problems, indicating that the online version did reach the targeted population with regards to gambling severity. The cognitive-behavioural workbook content has also been examined in an Internet-based format. Carlbring and Smit found promising results for a therapist-assisted Internet-based intervention based on the CBT components of self-help workbooks. Benefits were maintained up to 36 months post-intervention. An ongoing randomized trial is evaluating the efficacy of a self-directed Internet-based intervention (Self-Change Tools) incorporating workbook materials and relapse prevention. These tools are publically available at www.probлемgambling.ca.

Given that brief motivational interventions appear promising for disordered gamblers, the incorporation of such interventions into a self-directed, web-based intervention would be a potentially valuable tool. Very few computerized motivational interventions have been developed and pilot tested for other behaviours. For disordered gamblers specifically, a text-based motivational intervention was developed using transcriptions from prior research studies. Preliminary results from an ongoing RCT comparing the intervention to the web-based Check Your Gambling indicate that, similar to previous findings, all participants reported decreases in gambling involvement over the 3-month follow-up. However, there was no discernable difference between the two conditions in early results.

CONSIDERATIONS, LIMITATIONS, AND FUTURE DIRECTIONS

One consistent and notable finding across studies is the overall improvement in all study groups, including waiting-list control groups. Over short-term, this general improvement highlights the potential of the natural recovery process. However many of the studies reviewed here did not have a waiting-list control group for comparison at later time points, making it difficult to determine if non-significant between-group differences at later follow-up points were due to equivalent effect of the active interventions, or if the observed improvement
is due to the natural recovery process, or regression to the mean. Nevertheless, many of the studies did show an advantage for particular brief interventions across follow-up, highlighting the possibility to facilitate the natural recovery process and to enhance and sustain gains over time.

Technology and treatment is indeed an important area to study; with numerous advantages and clear benefit and applicability with disordered gamblers, it is an area for future development and study. However, Internet-based treatment is not without disadvantage, some surrounding ethical practice. Unlike in traditional intervention, ensuring respondent safety becomes more difficult. Respondents must be aware that the information they provide is not immediately reviewed. Providing resources is complicated by such widespread access, as geographical location remains a factor. In addition, to maintain elements of consent and confidentiality, individuals should be clearly informed of how their responses will be stored and used.

Some additional considerations surround client gender, client choice of abstinence or moderation outcomes goals, and gambling subtype. While research does indicate that women demonstrate rates of treatment seeking comparable to and, in some cases, greater than men, evidence regarding differential response to treatment is mixed. There does appear to be more empirical evidence supporting the notion that men and women do not significantly differ in their response to gambling treatments. Gender may still be an important factor to consider when selecting a brief treatment for an individual and differential treatment effects (or lack thereof) should be reported in future research.

Brief interventions tend to encourage clients to identify specific behavioural goals such as quitting all types of gambling, quitting problematic types, or moderating their involvements. These choices are associated with factors such as problem severity and motivation, and individuals’ goals shift over time for the majority of people as they struggle with the recovery process. It appears, however, that gambling behaviour outcomes are ultimately equivalent regardless of the path taken.

Finally, what about the notion that subtyping gamblers (e.g., behaviourally conditioned vs. antisocial impulsive vs. emotionally vulnerable) may not be as useful for predicting treatment outcomes in Gamblers Anonymous (GA) or CBT-based treatments. Examination of treatment outcome by gambler subtype has not been examined for brief motivational interventions. Brief interventions for disordered gamblers remain an emerging area of research. The limited number of studies examining each specific intervention requires replication to bolster positive findings and to aid in resolving inconsistent findings. Moreover, the long-term benefits of certain brief treatments (e.g., motivational interventions) remain unclear, making long-term monitoring important for future research and for clinical practice as well. Furthermore, examination of potential mediators of treatment efficacy can inform further development and study of such interventions. For example, Larimer and colleagues did find preliminary evidence for the mediating influence of perceived gambling frequency norms on the efficacy of their single-session personalized feedback intervention. In addition, the possible mediating influence of client change language on outcome in MI-based interventions has been examined for addictive behaviours, including disordered gambling. Determining the specific mechanisms by which these treatment are efficacious has important implications for developing and implementing effective interventions and effective adaptation (e.g., online tools).

CONCLUSION

Overall, brief interventions represent a promising way to reach disordered gamblers who are not seeking formal treatment. Although still a growing body of literature, studies have obtained promising results for various brief intervention strategies spanning a continuum of treatment options from minimal (e.g., self-directed tools) to brief interventions with minimal client contact (e.g., motivational interventions). Furthermore, advancement in technology offers a convenient and accessible way to provide these tools and may serve to overcome some barriers to seeking treatment, such as shame or stigma. Such interventions carry important implications for reaching the majority of disordered gamblers and function well for incorporation into stepped care models of disordered gambling.

In summary, the main resulting clinical tips include:

1. Brief interventions based on MI principles are a promising brief treatment, even with limited therapist contact (single session). This type of intervention is a good initial step for clients, especially those highly ambivalent about changing their gambling behaviour.

2. The empirical evidence supports the use of self-help interventions, particularly when combined with therapist contact. The inclusion of self-help materials for gamblers within practice, including facilitating client access to online self-help and web-based interventions, may provide additional benefit.
3. Consistent with a stepped-care model for disordered gambling, clinicians should increase familiarity with efficacious treatments spanning a continuum of intensity (e.g., minimally intensive self-help or therapist-assisted interventions, to brief motivational treatments, to more intensive options).

REFERENCES


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Impacts of a Self-Help Treatment Program for Problem Gamblers

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ABSTRACT

Despite availability of treatments for gamblers, few at-risk and pathological gamblers seek help. Self-help treatments offer a private and personalized alternative that may appeal to gamblers who need help. Objective: This study examines the impact of the self-help treatment JEu me questionne (JMQ) on gambling behavior and severity, and reports participants’ satisfaction. Method: Forty-seven at-risk and pathological gamblers entered the program that involved a self-help treatment workbook and two motivational phone interviews. Results: Among the 32 gamblers who completed the program, results indicated a significant reduction in the number of pathological gambling diagnostic criteria. This gain was maintained at the one- and six-month follow-ups. Time gambling and money spent were also significantly lower post-treatment, but only a reduction in time spent gambling was maintained at follow-up. Participants reported high satisfaction with the program. The discussion raises clinical and theoretical implications of these findings.

Keywords: Self-help treatment, pathological gambling, at-risk gambling, gambling disorder

Malgré la disponibilité des traitements pour les joueurs, peu de joueurs à risque et pathologiques entreprennent une démarche d’aide. Les traitements auto-administrés (TAA) proposent une formule individualisée et peu intrusive ayant le potentiel de rejoindre les joueurs réticents afin qu’ils demandent de l’aide. Objectifs : Cette étude examine les impacts du TAA JEu me questionne (JMQ) sur les comportements de jeu et la sévérité des problèmes de jeu et documente la satisfaction des participants. Méthode : Quarante-sept joueurs à risque et pathologiques ont débuté le programme comprenant un manuel d’auto-traitement et deux rencontres téléphoniques de type motivationnel. Résultats : Parmi les 32 joueurs qui ont complété le programme, les résultats indiquent une réduction significative du nombre de critères diagnostiques du jeu pathologique. Ce gain se maintient aux suivis 1 et 6 mois. Le temps consacré au jeu et l’argent misé diminuent également lors du post-traitement, mais seule la réduction du temps passé à jouer se maintient aux suivis. Les participants rapportent un taux élevé de satisfaction envers le programme. La discussion soulève les implications cliniques et théoriques de ces résultats.

Mots-clé: Traitement auto-administré, jeu pathologique, jeu à risqué

IMPACTS OF A SELF-HELP TREATMENT PROGRAM FOR PROBLEM GAMBLERS

Among people who gamble, some who will develop a gambling problem, identified as a Gambling Disorder in the most recent version of the Diagnostic and Statistical Manual of Mental Disorders. Others will experience problems relating to gambling without meeting the clinical level of the disorder, sometimes labeled at-risk gamblers. Among the available treatments, cognitive-behavioral therapy has received the most empirical support. However, Suurvali, Hodgins, Toneatto, and Cunningham revealed that only 3% of gamblers use some form of help for their problem gambling. Among pathological gamblers, only 29% report having used a formal
assistance resource. This rate rises to 53% when informal assistance such as self-help books or information on the Internet is included. The desire to resolve the problem by oneself, as well as shame and denial of the gambling problem, constitute the main obstacles for seeking help. This observation demonstrates the need to diversify treatment modalities.

Self-help treatment, a treatment program in which the individual undergoes a therapeutic process with the assistance of a treatment manual or workbook, with or without the support of a clinician, may overcome these help-seeking obstacles. Self-help treatment is easily accessible and fosters a greater awareness of the individuals’ responsibility towards their change process. A self-help treatment fits well within an early intervention perspective among at-risk gamblers and may constitute a portal for change among pathological gamblers.

Studies have highlighted that self-help treatments including the support of a clinician may reduce gambling behavior. Clinician support tailored according to motivational approach principles, often facilitates change. Robson et al. assessed a program inspired by motivational and cognitive-behavioral approaches that was delivered in two formats: individual (self-help manual and two meetings with a clinician) and group (self-help manual and six group meetings). The findings show a significant decrease in the amount of money spent, time spent gambling, and daily life problems related to gambling for participants of both groups (N = 60).

Hodgins et al. evaluated two self-help treatments for at-risk and pathological gamblers in comparison to a waitlist. Results indicate that treatment including a workbook alone or combined with a motivational phone interview decreases frequency of gambling, time spent gambling, and money spent gambling. At the 24-month follow-up, participants who had received motivational support maintained better therapeutic gains than those who had only received the workbook. Hodgins et al. showed that support calls combined with a self-help treatment manual produce similar improvements to receiving one motivational phone call with a treatment workbook or a treatment workbook alone 12 months post-treatment. Various combinations of self-help treatment thus decrease gambling habits up to 24 months after the end of treatment.

Based on existing self-help treatment knowledge, the Centre québécois d’excellence pour la prévention et le traitement du jeu (CQEP) at Université Laval created a self-help treatment program called Jeu me questionne (JMQ). JMQ is built on a cognitive-behavioral approach and aims to help at-risk and pathological gamblers modify their gambling habits. In addition to offering a self-help workbook, the program includes two motivational phone interviews conducted by clinicians specialized in problem gambling. JMQ offers two treatment goals, abstinence from the problematic type of gambling or controlled gambling with pre-established money, time, and frequency limits.

This study explored the impacts of the JMQ program on at-risk and pathological gamblers. More specifically, the study aimed to (1) assess changes in the behaviors of gamblers (i.e., time spent gambling, number of gambling sessions, money spent gambling) enrolled in the JMQ program, and the number of pathological gambling diagnostic criteria from the DSM-IV, and (2) evaluate the maintenance of these changes one and six months after the end of treatment. The secondary objective was to document participants’ satisfaction with the program.

Two hypotheses were evaluated: participation in the JMQ treatment program (i) will be associated with a decrease in gambling behaviors (number of gambling sessions, time spent gambling, and amount of money spent gambling) and number of pathological gambling diagnostic criteria, and (2) the therapeutic gains will be maintained at one- and six-month follow-ups.

METHOD

The study used a prospective clinical trial protocol to examine the therapeutic effects on key variables before and after treatment, and at one- and six month follow-ups.

PARTICIPANTS

Participants were mainly recruited through ads published in newspapers in different regions of Quebec and from the provincial problem gambling telephone help-line Gambling: Help and Referral. Recruitment took place from September 2007 to September 2009.

The inclusion criteria were: (a) at least 18 years of age; (b) therapy for gambling; (c) desire to decrease gambling habits; (d) not involved in therapy for gambling; (e) no indications of suicidal intentions; and; (f) sufficient French reading and writing skills. Forty-seven people were eligible and began the program.

MATERIAL

The screening interview included the SOGS and sociodemographic questionnaire. All other instruments were administered at the beginning (pre) and end (post) of treatment, and at the one- and six-month follow-ups.

Sociodemographic questionnaire. This questionnaire,
developed for this study, included questions regarding participants’ age, gender, place of birth, marital status, education, occupational status, and income.

**South Oaks Gambling Screen (SOGS)** (Lesieur & Blume, 1987). The SOGS is a pathological gambling screening instrument comprised of 20 multiple choice or dichotomous response items. A score between 0 and 2 correspond to non-problem gambling, a score of 3 or 4 to at-risk gambling, and a score of 5 to 20 to probable pathological gambling. This instrument has a reliability coefficient of 0.71 and an internal consistency reliability coefficient of 0.97.

**Pathological gambling diagnostic interview-revised (Ladouceur, Boutin, Lachance, Doucet, & Sylvain, 2000).** This semi-structured interview evaluated various aspects of gambling related problems: gambler’s motivation to participate in the study, treatment goal (controlled gambling or abstinence), characteristics of the current gambling problem, history of gambling, and consequences of gambling on different life spheres (e.g., social, professional and psychological). This interview also included the ten pathological gambling diagnostic criteria according to the DSM-IV (APA, 1994). Each criterion was assessed using the following time frame “Over the last days/weeks...”. To receive a diagnosis of pathological gambling, at least five of ten criteria must be endorsed. Finally, this interview assessed the presence of other addictions and suicidal ideation.

**Questions about gambling (Sylvain, Ladouceur, & Boisvert, 1997).** This questionnaire is comprised of three questions evaluating time spent gambling, money spent gambling, and frequency of gambling over the course of the week preceding evaluation. No study has been conducted to establish the scientific validity of the questionnaire’s items.

**JMQ program satisfaction questionnaire.** This questionnaire evaluated participants’ degree of satisfaction with seven elements of the program on a Likert-type scale ranging from 0 (extremely low) to 5 (extremely strongly). These elements included: pertinence, results obtained, confidence in recommending the program, quality of the workbook, care received by the clinician, skills and knowledge provided, and appreciation of the motivational interviews.

**Other measurement instruments:** The French version of the “Readiness to Change Questionnaire”\(^{\text{20}}\), the Social Readjustment Rating Scale\(^{\text{21}}\), the Life Satisfaction Questionnaire\(^{\text{22}}\), and the Self-efficacy Perception Questionnaire\(^{\text{23}}\) were administered to the participants. However, because of participants’ poor understanding of certain items and a lack of a posteriori relevance of the constructs, results obtained on these instruments were not retained for analyses.

**Self-help treatment workbook**\(^*\). The “JEu me questionnaire” workbook\(^{24}\) comprises 144 pages and is divided into five phases that involve exercises and readings on gambling. The workbook provides guidelines regarding time required to complete each phase. Complementary tools are offered in the appendix, such as a budget table, relaxation exercises, and problem-solving strategies. Each phase accompanies the gamblers throughout their change process, from awareness of the gambling problem to relapse prevention. Phase 1 of the workbook helps gamblers to clarify the importance of gambling and to examine their ambivalence toward change. Phase 2 leads gamblers to identify at-risk situations for gambling and behavioral strategies to cope with these situations. In phase 3, gamblers determine their goal, abstinence or controlled gambling, and implement the suggested behavioral strategies. Gamblers are also informed of the characteristics inherent to gambling and the erroneous thoughts that they may provoke. Phase 4 aims to identify automatic thoughts and their impacts on gambling habits. Finally, phase 5 involves two sections, the first section aims to help modify the automatic thoughts relating to gambling into more realistic and adapted thoughts. The second section enables gamblers to identify and apply strategies that will help them maintain their controlled gambling habits or abstinence, and to prevent relapse. Participants complete the program at their own pace, although a six to eight week duration is recommended.

**Motivational interviewing protocol.** The phone interviews were based on Miller and Rollnick’s\(^{25}\) motivational approach principles. Protocols created for the purposes of JMQ guide the clinician. The two interviews are based on similar protocols, the first begins with providing the gambler with brief feedback on his or her results obtained during the pre-treatment evaluation. During these

\(\text{\textsuperscript{1}}\) For more information on the content of the JEu me questionnaire treatment program, the reader is invited to address the first author.
interviews, the clinician and the gambler discuss motives for undertaking this program and ambivalence toward decreasing or ceasing gambling. Anticipated obstacles or those already encountered are also discussed. Emphasis is placed on the gambler’s change by highlighting advantages of change and increasing confidence in attaining one’s goals. Each of these interviews lasts between 30 and 60 minutes.

PROCEDURE

This study was approved by the sectorial research ethics committee of Université Laval, the Comité en psychologie et en sciences de l’éducation (# 2007-209 A-2).

Therapists. Two research professionals and three psychology doctoral students who specialize in gambling, worked as therapists and interviewers during the application of the program. These students received two days of training on the application of the motivational approach among problem gamblers.

Study procedure. One therapist contacted participants in order to provide information about the program, to verify their eligibility and to obtain their verbal consent. Ineligible participants were provided with a list of help resources by mail and a help-line phone number. The therapists then conducted a pre-treatment phone evaluation lasting approximately 45 minutes. In the days following this evaluation, participants completed an initial motivational phone interview and the self-help workbook was mailed to them. At the third week of the program, participants completed a second motivational interview. Over the course of treatment, additional telephone support was available upon request. In these additional supports, therapists provided active listening, advice, and encouragement. Participants completed the workbook at their own pace. When they considered the treatment to be completed, a post-treatment evaluation was conducted followed by one- and six-month follow-ups. A $25 CAD grocery store gift card was mailed after each assessment.

RESULTS

DESCRIPTIVE DATA

Sociodemographic characteristics of the participants. The sample comprises 47 eligible participants who completed the pre-treatment evaluation. Table 1 depicts the sociodemographic characteristics.

Motives for consulting. The reasons identified by the 47 participants for seeking assistance were the negative consequences of gambling (55%) and the loss of control over gambling habits (53%). Participants’ main interest in the program were the advantages of a self-help format (47%). Thirty percent of the participants specified that they would have undertaken treatment, either self-help or conventional, and 51% said they would not have undertaken a conventional treatment. Almost all participants (98%) report having tried to control their gambling habits by themselves.

Current gambling habits and problems. The most problematic gambling game was video lottery terminals and slot machines (89%). Thirty-seven of the 47 participants (79%) met criteria for pathological gambling (DSM-IV; APA, 1994), with a mean score of 6.2 (SD = 2.0) criteria. In the week preceding pre-treatment evaluation, 60% of participants had spent a median amount of $400 CAD. The median number of gambling sessions was three, and the median amount of time spent gambling was five hours.

TREATMENT COMPLETERS VS. DROPOUTS

The time required to complete the JMQ program varied between one and 25 weeks, with a median of nine weeks. Among the 47 participants, 68% (n = 32) completed the program, 60% (n = 28) took part in the one-month follow-up, and 53% (n = 25) completed the six-month follow-up. During the program, 15 completers received additional support contacts with the therapists, and four undertook additional steps to counter their gambling problem. Among the 25 participants who completed the 6-month follow-up, 8% had sought additional help, such as other formal treatment.

At the pre-treatment assessment, the 32 completers significantly differed from dropouts (n = 15) on certain variables. The negative consequences of gambling on spousal relationships, and their financial situation were greater among dropouts, t(22) = 2.32, p = .030 and t(44) = 2.92, p = .006, respectively. More dropouts consumed illicit drugs before gambling, χ²(1, 46) = 6.63, p = .030, and time spent gambling was greater among dropouts, t(8) = 2.45, p = .042. No differences between completers and dropouts were found on DSM-IV score, gender, age, marital status, level of education, occupation and income.

TREATMENT GOAL

Sixty-two percent of completers (n = 20) chose abstinence as a treatment goal. This rate changed to 57% (n = 16) at the one-month follow-up and 48% (n = 12) at the six-month follow-up. Both treatment goals combined, 75% of the 32 completers reported having attained their objective at the time of post-treatment evaluation and at the one-month follow-up, and 72% at the six-month follow-up.
IMPACT OF THE PROGRAM*†

Gambling severity. Among the 32 completers, the Time effect was significant, $\chi^2(1, 32) = 17.54, p < .001$. The proportion of pathological gamblers dropped from 71.9% before treatment to 18.8% after treatment ($\chi^2(1, 32) = 22.88, p < .001$). This improvement was maintained at the one-month follow-up, with a rate of 21.5%, $\chi^2(1, 32) = 16.83, p < .001$, and at the six-month follow-up, with a rate of 29.0%, $\chi^2(1, 32) = 13.82, p < .001$. The mean DSM-IV score was 6.2 before treatment, 2.6 after treatment, 2.3 at one-month follow-up, and 3.0 at six-month follow-up. This Time effect is statistically significant, $F(3, 80) = 40.06, p < .001$. Contrast tests indicate a decrease in DSM-IV score between the beginning and end of treatment, $t(80) = 10.39, p < .001$, and these gains are maintained at 1-month follow-up, $t(80) = 9.94, p < .001$, and 6-month follow-up, $t(80) = 8.59, p < .001$.

Gambling habits. Time spent gambling decreased significantly over the course of treatment, $\chi^2(3, 46) = 10.29, p = .016$. Participants spent more time gambling during the week preceding pre-treatment evaluation compared to the week preceding post-treatment evaluation, $\chi^2(1, 46) = 24.22, p < .001$, one-month follow-up, $\chi^2(1, 46) = 7.97, p = .005$, and six-month follow-up, $\chi^2(1, 46) = 3.96, p = .047$. No difference was observed for the number of gambling sessions between pre-treatment and post-treatment evaluation, $p > .05$.

Money spent gambling decreased during treatment, $\chi^2(3, 46) = 12.15, p = .007$. Contrast tests indicated that the participants spent more money on gambling during the week preceding treatment compared to the week preceding post-treatment evaluation, $\chi^2(1, 46) = 47.23, p < .001$. However, the gains observed at the end of treatment were not maintained at one- and six-month follow-ups, $p > .05$.

SATISFACTION WITH THE PROGRAM

The mean satisfaction rate of program completers was 3.9 out of 5 ($SD = 1.0$). The degree of satisfaction reached 4.3 ($SD = 0.7$) and 4.7 ($SD = 0.5$) for the workbook and motivational interviews respectively. Participants reported a mean satisfaction rate of 4.9 ($SD = 0.3$) in regard to the work of the therapists.

DISCUSSION

This study aimed to evaluate the impact of the JEu me questionne (JMQ) program on the severity of gambling problems and habits. The first hypothesis stipulating a decrease in number of pathological gambling criteria and gambling behaviors (i.e., number of sessions, time gambling and money spent) at post-treatment was partially confirmed. Indeed, the number of diagnostic criteria for pathological gambling, the number of pathological gamblers, the amount of money spent gambling, and time spent gambling decreased after treatment. This result supports the works of Hodgins et al.44. However, the number of gambling sessions did not significantly decrease after treatment, and therefore contrasts Hodgins et al.’s findings. This difference could be explained, in part, by the treatment goal chosen by the gamblers. Note that 38% specified controlled gambling as their goal, as compared to 14% of the participants in the study conducted by Hodgins et al.44. Within this context, a decrease in number of gambling sessions is more difficult to observe since several participants were not seeking to cease gambling.

The second hypothesis stipulating that the therapeutic gains will be maintained at one- and six-month follow-ups was partially confirmed. Although the reduction in number of diagnostic criteria and time spent gambling were maintained at the six-month follow-up, the reduction in money spent gambling was not maintained at the follow-ups. The therapeutic gains, except for money spent and frequency of gambling, were maintained for a longer time. These findings suggest that JMQ leads to durable gains. However, in order to assure long-term reduction of the amount of money bet, some modifications need to be added to JMQ, mainly by emphasizing the management of personal finances, thus raising gamblers’ awareness of the financial impacts of their gambling habits.

The secondary objective was to examine participants’ satisfaction with the program. The overall results

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* Considering the high percentage of missing data (32% post-treatment, 40% at one-month and 47% at six-month follow-up), different longitudinal analysis methods were used. In order to examine the robustness of the results obtained, analyses conducted on program impact were carried out using both a missing at random (MAR) and missing completely at random (MCAR) hypothesis. All Time effect results using the MAR hypothesis were similar to those obtained using the MCAR hypothesis. For contrast tests using the MCAR hypothesis, there are changes observed in two variables: time spent gambling and money spent gambling. To remain conservative, these findings are presented under the MCAR hypothesis.
indicated that participants appreciate the workbook, the self-help format, and the therapists’ involvement. These results confirm those previously reported13,14, 26.

Since the program components were not studied separately, it is impossible to evaluate the respective impacts of the motivational type interviews and the self-help. Hodgins et al.14 suggested that motivational interviews added to a self-help treatment workbook favors gamblers’ early improvement compared to a workbook alone.

Thirty-two percent of participants failed to complete the intervention. Although this dropout rate is higher than those of 4 % and 9 % reported13,14, this percentage is similar to the dropout rate reported in several conventional studies27. Contrary to the studies by Hodgins et al., where post-treatment evaluation occurred four to six weeks after the start of treatment, the post-treatment evaluation in the present study took place only when participants completed the program. Fortunately, 68 % of participants managed to progress at their own pace and completed the program therefore suggesting that problem gamblers respond well to this type of treatment format.

Certain characteristics differentiate the completers from the dropouts. Gamblers who dropped out presented more financial and marital problems than completers, and were spending more time gambling during the week preceding pre-treatment evaluation. Quitting gambling may be more difficult for gamblers with more severe problems since this activity is perceived as the only ways of recovering money lost and to deal with negative emotions28. Finally, it is possible that the completers were more motivated and less affected by gambling. The self-help format may be better suited to a certain type of gamblers more willing to complete treatment.

STRENGTHS AND LIMITATIONS OF THE STUDY

This study involves positive elements that should be highlighted. Firstly, the decrease in problem gambling severity is found not only in gambling behaviors reported29, but also in the diagnostic evaluation conducted by clinicians. The second strength of the study is the use of a six-month follow-up.

However, among the limitations, we need to point out the absence of a comparison group. Also, the sample size should be increased to draw more precise statistical conclusions. The treating clinicians also conducted the assessments and therefore may have introduced bias. For example, participants may have minimised their gambling habits in order to please their therapist. Nearly half of the participants obtained additional contacts with a therapist during the treatment period. Although some participants benefited from this support, this created treatment variability that limits the ability to draw conclusions from the findings. However, this variability could constitute a strength of self-help treatment, as undertaking a program like JMQ is nonintrusive as an initial treatment seeking step29, 12. The overall results of this study highlight the potential impact of JMQ to produce therapeutic gains among at-risk and pathological gamblers.
REFERENCES

TABLE 1 Sociodemographic characteristics of participants who completed the pre-treatment evaluation

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Participants (N = 47)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (SD)</td>
<td>50 (13.0)</td>
</tr>
<tr>
<td>Women</td>
<td>55 %</td>
</tr>
<tr>
<td>Quebec origins</td>
<td>91 %</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>70 %</td>
</tr>
<tr>
<td>In a relationship</td>
<td>30 %</td>
</tr>
<tr>
<td>Level of education completed</td>
<td></td>
</tr>
<tr>
<td>Elementary</td>
<td>9 %</td>
</tr>
<tr>
<td>Jr/Sr high</td>
<td>57 %</td>
</tr>
<tr>
<td>College</td>
<td>13 %</td>
</tr>
<tr>
<td>University</td>
<td>21 %</td>
</tr>
<tr>
<td>Main occupation</td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>68 %</td>
</tr>
<tr>
<td>Retired</td>
<td>19 %</td>
</tr>
<tr>
<td>Unemployed/unemployment insurance/social assistance</td>
<td>13 %</td>
</tr>
<tr>
<td>Household gross income</td>
<td></td>
</tr>
<tr>
<td>Less than 20 000$ CAD</td>
<td>17 %</td>
</tr>
<tr>
<td>20 000 to 39 999$ CAD</td>
<td>33 %</td>
</tr>
<tr>
<td>40 000 to 59 999$ CAD</td>
<td>24 %</td>
</tr>
<tr>
<td>60 000$ CAD and more</td>
<td>26 %</td>
</tr>
</tbody>
</table>

Note. No statistical testing was conducted on these data.
Complimentary Forces of Change: Contingency Management and Behavioural Momentum as Treatments for Problematic Gambling

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ABSTRACT

Objectives: A review and discussion of the literature relating to contingency management and behavioural momentum as treatments for problematic gambling. Contingency management is a procedure that reinforces performance of the target behaviour and provides no reinforcement for non-performance of the target behaviour. Behavioural momentum is a theory based on an analogy taken from Newtonian physics where response rates are analogous to the velocity of a physical body in motion, and the reinforcement history of this behaviour is analogous to the mass of the physical body.

Methods: A narrative review and discussion of the published literature on contingency management and behavioural momentum as treatments for problematic gambling. Results: Although a significant literature exists regarding contingency management as a treatment for substance dependence, and a smaller literature exists relating behavioural momentum to substance dependence, both with strong theoretical and empirical foundations, the literature applying either to problematic gambling is sparse. The limited gambling research has found that contingency management increases treatment attendance, reduces gambling behaviour, and improves psychological and social experiences. Behavioural momentum appears to be virtually non-existent in the problem gambling treatment literature. However, behavioural momentum is conceptually congruent with contingency management and provides new ways to improve the efficacy of contingency management as a treatment for problem gambling. Conclusions: Contingency management and behavioural momentum offer two new and powerful approaches for influencing problematic gambling and also for measuring the likely success of these and other interventions.

Key Words: Contingency Management, Behavioural Momentum, Disordered Gambling, Treatment, Operant

Objectifs: Une recension et discussion des écrits sur la gestion des contingences et la dynamique comportementale comme traitement pour les problèmes de jeu de hasard et d’argent. La gestion des contingences est une procédure qui encourage la réalisation d’un comportement ciblé et qui ne procure aucun encouragement lorsque le comportement n’est pas réalisé. La dynamique comportementale est une théorie inspirée de la physique de Newton où les taux de réponse sont analogues à la vitesse d’un corps en mouvement et les antécédents d’encouragement du comportement à la masse du corps physique. Méthodes: Un examen narratif et discussion de la littérature sur la gestion des contingences et la dynamique comportementale comme traitement pour les problèmes de jeu de hasard et d’argent. Résultats: Bien qu’il y ait de nombreux écrits avec des fondements théoriques et empiriques forts sur l’utilisation de la gestion des contingences pour traiter la dépendance aux substances et sur la dynamique comportementale, quoique moins nombreux pour cette dernière théorie, les écrits sur leur application pour le traitement des problèmes de jeu de hasard et d’argent sont rares. Le peu de recherche sur le jeu de hasard et d’argent a démontré que la gestion des contingences augmente les présences au traitement, réduit les comportements de jeu et
améliore les expériences psychologiques et sociales. Toutefois, le concept de la dynamique comportementale s’harmonise avec la gestion des contingences et procure de nouvelles façons d’améliorer l’efficacité de la gestion des contingences comme traitement des problèmes de jeu. Conclusions : La gestion des contingences et la dynamique comportementale sont deux approches nouvelles et performantes pour agir sur la problématique du jeu et pour mesurer le succès probable de ces approches et d’autres interventions.

Mots-clés : Gestion des contingences, dynamique comportementale, jeu pathologique, traitement, opérant

CONTINGENCY MANAGEMENT

Contingency Management is a form of behaviour modification where participants receive rewards for performance of the target behaviour and are not rewarded if they fail to perform the target behaviour. The theoretical basis of this therapy is that the frequency of operant (i.e., voluntary) behaviour is often the result of the consequences of the behaviour. This relationship suggests that behaviour is a lawful response to the environment. The extensive body of behavioural research examining the effect of contingencies and reinforcement schedules has resulted in a sizable literature about how organisms learn and acquire skills, and also how contingencies can modify behaviour for the betterment of the individual and society. One area of significant impact has been the application of contingency management in the treatment of substance dependence.

The application of contingency management in the treatment of substance dependence typically requires the participant to supply a urine specimen that is negative to the addictive substance. Immediately after the negative specimen is provided the participant typically receives a small credit on a voucher than can be redeemed at local businesses. Other approaches include access to valued privileges in residential settings, and greater flexibility of dosing for pharmacological interventions. Contingency management approaches can also improve medication adherence, workbook completion, and clinic behaviour.

LITERATURE REVIEW

The initial step in the development of this study was to review the major publications regarding contingency management and behavioural momentum. These papers were a combination of those that were highly cited (e.g., Lussier et al., 2006), and review articles on these issues (Petry 2010; Nevin & Grace, 2010). Further, additional manuscripts were sourced from well-known health science and gambling databases (i.e., PsychINFO, PubMed, PsycARTICLES, Ovid HealthSTAR, MEDLINE, ScienceDirect, and Google Scholar). Articles were selected using the boolean operators AND/OR and the following search terms; “contingency management”, “behavioral momentum”, “substance”, and “gambling”. No searches were restricted by date. Additional grey literatures were included only when it was directly related to the current review and no peer-reviewed journal alternative was available (e.g., West, 2008). However, as the Canadian Journal of Addiction Medicine has a maximum number of references (i.e., 40 references), only those directly relating to significant issues (e.g., Hart et al., 2000), the latest articles, and seminal work (e.g., Skinner, 1953) are included.

CONTINGENCY MANAGEMENT PROCEDURE

The contingency management procedure has three basic components; 1) target behaviours are identified, 2) motivational incentives are provided after demonstration of the target behaviour, and 3) incentives are unavailable when the participant fails to perform the target behaviour. These components can be further improved by increasing the rate of incentives for sustained performance of the target behaviour and resetting following a lapse, immediately delivering the reward after performance of the target behaviour, and increasing the magnitude of the reward.

CONTINGENCY MANAGEMENT OUTCOMES

Typically, the use of a contingency management program results in greater out-patient attendance, and reduced substance use. A substantial contingency management treatment literature exists that shows contingency management has significant treatment efficacy for several substances including cocaine dependence, marijuana dependence, tobacco consumption, opioid use, poly-drug use, and other drug use. Further, contingency management has been a successful treatment for a range of populations and settings. For example, contingency management has improved clinical outcomes for adolescents, dual-diagnosis, groups, veterans, and women. Moreover, systematic reviews and meta-analyses have consistently found contingency management to have the largest average treatment effect sizes compared to other interventions.

Meta-analyses have found a number of potential
moderating variables. Notably, the length of a contingency management program made little difference in the treatment effect size. Although all treatment durations resulted in significant changes from base-line, there was no appreciable difference in treatment effect size between less than 2 weeks and more than 12 weeks of treatment. However, two important elements of contingency management appeared to result in greater changes in treatment. As the daily earnings from contingency management increased so did the effect size in a predictable step-wise pattern, although non-significantly. Further, although both immediate and delayed reinforcement resulted in significant changes, immediate reinforcers provided a significantly greater effect compared to delayed reinforcement. These results suggest that reinforcer rate, especially the immediate delivery of reinforcers, results in large and predictable changes in behaviour.

OUTPATIENT AND INPATIENT SETTINGS

The majority of contingency management research has been conducted in outpatient settings. Research has examined contingency management in the context of randomised trials, comparisons between vouchers and prizes, combining contingency management and cognitive behavioural therapy, and low cost contingency management approaches, among others. However, a more limited pool of contingency management research has been conducted in residential settings. These studies often look to promote smoking abstinence for patients or otherwise improve the health outcomes of residents. Typically, the size and type of reinforcement differentiates these settings, where outpatients require reinforcers that can be applied to a variety of goods across many locations (e.g., Walmart gift-cards), and are typically of a greater magnitude than used in residential programs. By contrast, residential settings require abstinence from substance use so contingency management programs are only appropriate for addressing other behaviours that are not the focus of the treatment centre (e.g., smoking). Further, valued reinforcers in residential settings are usually low-cost (i.e., access to recreational opportunities or contact with others outside of the residential centre). Nevertheless, the same principles apply. The target behaviours are identified, the residents have the opportunity to perform the target behaviour, the target behaviour is objectively verified, the reinforcer is of value, and the delivery of the reinforcer is immediate.

TARGET BEHAVIOUR VERIFICATION

The usual contingency management procedure is to objectively assess whether the target behaviour has recently occurred. Typically, in substance abuse treatment studies, urine specimens are collected and are tested for specific substances or their metabolites. However, this is obviously not appropriate for testing recent gambling behaviour where no substance is ingested. Nevertheless, there are a number of approaches that can be used to triangulate whether the client has engaged in gambling. First, evidence of cash-withdrawals from the client’s bank or credit card is likely to provide very clear evidence of instances where the client has withdrawn cash for unexplained purposes. This will require the client to satisfy the counsellor that they are transparent when discussing their expenditure. Second, regular contact with persons whom the gambler has a close relationship with is likely to expose the gambler’s current gambling, especially if this person has joint financial arrangements with the client. The significant other will need to either speak or provide some evidence to the counsellor substantiating the client’s gambling behaviour. Involving the significant other will also heighten their interest in the client’s behaviour and will make it more difficult for the client to gamble without their knowledge. Although these procedures are invasive, the combination of these assessments are likely to successfully verify recent gambling behaviour and provide additional sources of pressure for the client to sustain gambling abstinence.

CONTINGENCY MANAGEMENT AND GAMBLING

Only a few studies have examined the effect of contingency management on gambling behaviour. Petry and colleagues compared substance dependent adults who were randomised to contingency management and standard care, or to standard care only, for the treatment of substance dependence, and found no differences between groups in gambling behaviour across time. However, approximately 15% of non-methadone patients in both treatment groups, and 21% of methadone patients in both treatment groups gambled during
the study\textsuperscript{4}. Petry and Alessi\textsuperscript{4} analysed data from three similar trials where participants were randomly allocated to standard care and contingency management or standard care only for the treatment of substance dependence. Petry and Alessi\textsuperscript{4} found that clients allocated to the contingency management group who were gambling at baseline reported the biggest decreases in Addiction Severity Index (ASI) gambling scores\textsuperscript{4}. However, they also reported an interaction effect for both standard care and standard care plus contingency management groups. Participants who were gambling at baseline reduced their average ASI gambling scores from baseline to post-treatment (i.e., standard care: .12 - .10, CM .11 - .04), whilst those who were not gambling at baseline minimally increased their average ASI gambling scores (i.e., standard care .00 - .019, CM .00-.01)\textsuperscript{1}. However, the contingency management procedure used in both studies was to reinforce abstinence from substance use or reinforce the goals consistent with their treatment plans, rather than to reduce gambling. Despite the success of contingency management as a treatment for substance dependence, and similar phenomenological, genetic, and neurological factors in both disorders\textsuperscript{3}, only one published study has used contingency management as a treatment for problematic gambling.

West\textsuperscript{26} investigated the clinical outcomes of nine problem gamblers who received standard counselling and vouchers for completion of self-selected goals. These were compared with service-wide treatment outcomes and clinical outcomes from published gambling treatment studies. The contingency management component was a 10 minute period that was added to eight standard counselling sessions. The contingency management component required counsellors to ensure client goals were within reasonable reach and were congruent with client characteristics, problems/severity, and life circumstances. Counsellors relied on self-reports that goals were achieved. The rewards were vouchers that could be redeemed for goods and services, where voucher size increased with achievement of successive goals. The initial voucher was a $30 gift card with a cumulative total worth $250. In addition, West interviewed the clients and counsellors.

West compared study retention, gambling behaviour, money lost, and life functioning changes over one year. She found most of the self-identified contingency management goals were related to non-gambling behaviours rather than abstinence from gambling; where the average total that clients received for goal completion was $99.44. Further, some clients were unable to achieve their initial goal, and nobody received the maximum amount of vouchers.

Contingency management clients reported significant reductions in gambling behaviour including frequency of gambling (66.7\%), time spent gambling (64.5\%), money spent gambling (82.7\%), and net losses (82.0\%). West reported these results were clinically important. In addition, all of the quality of life domains significantly improved (i.e., family, relationships/social, financial, and emotional/psychological). Moreover, compared to service-wide averages, clients attended more sessions (4.8 vs. 3.3), and reported higher percentages of reductions in their gambling-related problems, so no further treatment was necessary (44% vs 2\%).

However, the interviews revealed that some clients and counsellors had reservations about the use of vouchers to reward non-gambling behaviour. Although appreciative of the vouchers, some clients reported they were uneasy about accepting the vouchers. Similarly, although the counsellors thought the goal setting process was valuable, some considered the vouchers might lower the intrinsic motivation of clients to engage in self-change. Similar criticisms have been made by others, although this line of argument seems to ignore the various ways performance is rewarded in other areas (e.g., work) and in other treatment settings (e.g., reducing self-harm)\textsuperscript{4}.

Further, the counsellors relied on client self-reports as evidence of goal attainment. This procedure was problematic and makes the contingency management program vulnerable to deception from gamblers who wish to obtain the reinforcers whilst continuing to gamble. However, as stated above, alternative approaches that attempt to independently and objectively verify whether the client is gambling (i.e., collaborating evidence by significant others) can be implemented that will lessen the likelihood that gamblers successfully deceive counsellors.

Similarly, the West study has issues regarding the size, frequency, and target of reinforcement. Participants in contingency management studies for substance abuse can earn vouchers up to $997.50 for a 12-week study\textsuperscript{40}. By contrast, the average voucher earnings in the West study was $99.44 for one-year. Further, reinforcement in the West study was delayed as vouchers were sent by post by the study co-ordinator and not immediately available as in typical substance abuse studies. Moreover, the goals that were reinforced were those for other behaviour and not for abstinence from gambling. The combination of

\textsuperscript{*} Approximate scores from Figure 1 in Petry et al. 2006
\textsuperscript{†} Approximate scores from Figure 1 in Petry and Alessi\textsuperscript{24}
the small size of the reinforcement, the delay between performing the target behaviour and receiving the reinforcement, and the non-reinforcement of gambling abstinence significantly decreased the usual efficacy of the contingency management procedure.

However, another criticism of contingency management in general is the expense of providing rewards for the performance of the target behaviour, especially in treatment environments that are typically resource conscious (i.e., addiction treatment centres). However, the costs of contingency management treatments can approximate other forms of counselling, and when compared to the more expensive approaches, are often cheaper. For example, Christensen calculated that the cost of the typical contingency management program to be approximately $3.3 per minute. This compares to the Psychologists’ Association of Alberta recommended fees for a treatment session estimated at approximately $3.8 per minute.

In summary, contingency management has been found to be a successful treatment for substance dependence for a range of populations and settings. It has also been used as a treatment for problem gambling with positive results. However, some counsellors criticise this approach because of its focus on extrinsic motivation, while others note the added expense of providing rewards within typically resource conscious settings. One approach that is theoretically congruent with contingency management that is likely to improve clinical outcomes and may provide a more cost efficient approach is the application of behavioural momentum.

**BEHAVIOURAL MOMENTUM**

Behavioural momentum is a theory of voluntary behaviour. It was developed from the theories of discriminant-operant relations where behaviour and reinforcement determine performance. This is the rate of the behaviour, resulting from the contingencies between discriminate stimuli-response associations, and reinforcement histories. The relationship between response rate and reinforcement history is thought to be analogous to the second law of motion of Newtonian physics (i.e., the velocity of an object in motion is directly proportional to the magnitude of the disrupting force and inversely proportional to the mass of the object).

When reframed in terms of behaviour, the rate of voluntary repeatable behaviour in the presence of a discriminable stimulus is analogous to the ‘velocity’ of a body in motion, and when responding is disrupted in some way, this disruption is analogous to an external force acting on a moving body, reducing the response rate of the target behaviour. The history of reinforcement is similar to the inertial ‘mass’ in Newtonian physics, and reflects the likelihood the target behaviour will be repeated in the future. Essentially, as the rate of reinforcement increases so does the ‘mass’ of the target behaviour, increasing the likelihood that the target behaviour will be repeated and also reducing the effects of a disruptor (e.g., the influence of drug using peers). These relations are mathematically expressed in Appendix 1.

A wide range of laboratory studies across species have found responding to follow behavioural momentum principles. For example, Hart et al. assessed response allocation by experienced cocaine users when given a choice between smoking cocaine at increasing dosages (0, 12, 25, 50mg) or receiving alternative reinforcement (either $5 cash or a $5 voucher) available on discharge. The disrupting effect of increasing amounts of cocaine was more pronounced (i.e., greater number of cocaine choices within a session) for the alternative providing the less valuable reinforcement (i.e., vouchers for merchandise) than the more valuable alternative (i.e., money). Figure 1 illustrates a hypothetical situation similar to Hart et al. where performance on the lean schedule of reinforcement decreases to a greater degree than the rich schedule compared to baseline as the disruptor duration or magnitude increases.
**BEHAVIOURAL MOMENTUM AND ADDICTION**

Although these analogies and equations seem a world apart from the treatment of problem gambling, there are parallels. First, evidence of control by environmental stimuli can impact the likelihood of relapse depending on whether the stimuli act as disruptors to the reinforcing effects of gambling treatment (e.g., socialising with gambling friends\(^3\)), or if stimuli act as a support or a reinforcer in its own right for gambling abstinence (e.g., enjoying better family relationships or spending quality leisure time with non-gamblers\(^3\)). Second, historical stimulus-reinforcer relations and reinforcement rates are associated with gambling severity and likelihood of relapse and treatment effectiveness. For example, research examining treatment efficacy suggests that gamblers with more severe gambling problems respond better to extended treatments; their gambling has a greater ‘mass’ so they require more treatment to disrupt their gambling behaviour\(^3\). Moreover, those who gamble more frequently are more likely to be problem gamblers\(^3\), and although binge gambling is typically associated with periods of abstinence, some research suggests binge gamblers in recovery can quickly escalate from recreational gambling to binge gambling when re-engaging with the activity\(^3\). Sometimes binge, or high ‘velocity’ gambling, is part of a risk-seeking life-style where risk-seekers engage in periods of binging on drugs and gambling, and alternate between the two, depending on the current level of engagement in these activities and finances, resulting in extended periods of risky behaviours; these behaviours have greater behavioural ‘mass’ and so are difficult to stop\(^7\). Similar relations appear in the substance abuse literature\(^3\). Consequently, and congruent with behavioural momentum, problem gambling appears to show ‘velocity’ like and ‘mass’ like effects. These similarities have treatment implications.

**CLINICAL APPLICATION OF BEHAVIOURAL MOMENTUM**

Although, to my knowledge, there has been no published applications of behavioural momentum to gambling there are parallels that can be drawn from the substance use literature. Specifically, Christensen et al.\(^4\) provided a case vignette that illustrates the power of using treatments that reinforce continuous performance of the target behaviour. SM was a 22-year old single female with a 6-year history of addiction to opiates and other drugs. Her goals were to stay clean to establish better relationships. SM received an internet-delivered behavioural therapy, regular buprenorphine dosing, and contingency management for substance abuse. Across treatment, and over the 3- and 6-month follow-ups, she provided negative urine specimens resulting in the maximum voucher compensation of $997.50. At trial completion she chose a 5-week gradual buprenorphine reduction. These results suggest lasting treatment effects where SM’s abstinence had gained sufficient behavioural ‘mass’ to compete with drug-taking disruptors. These effects were noticeable even after buprenorphine was stopped indicating contingency management rather than buprenorphine created the new behavioural habit of abstinence.

**CONTINGENCY MANAGEMENT AND BEHAVIOURAL MOMENTUM IMPLICATIONS FOR TREATMENT**

Typically, problem gambling counsellors see their clients once a week over a period of time to assist in gambling cessation. However, applying the principles of contingency management and the analogy of behavioural momentum to treatment will increase the likelihood that a client will become abstinent. This will require two main adjustments to the typical counselling program.
First, providing reinforcers contingent on evidence for abstinence from gambling. Second, provide numerous opportunities for the client to gain reinforcement for performance of abstinence. These two steps will require some creative approaches in the treatment of problem gambling, but are likely to enhance the efficacy of clinical outcomes when combined with other treatment practices. Moreover, these two components will likely create significant behavioural 'mass' for abstinence once the extrinsic reinforcement has been withdrawn. Further, this approach also allows for a test of the behavioural 'mass'. Discussing recreational gambling at the end of treatment and noting client responses will test whether the gambler has developed a lasting non-gambling habit that is resistant to disruption.

These outcomes appear to be supported from a meta-analysis presented earlier. Lussier and colleagues suggested that the duration of contingency management treatments might be less important than the amount of daily earnings. This is congruent with the effects of increasing the 'velocity' of reinforcer rates where greater reinforcement rates results in greater treatment effect sizes. Further, these results suggest behavioural momentum quickly changes behaviour so it might be possible that sufficient behavioural 'mass' can be achieved without extended periods of training. Consequently, because of the likely faster response 'velocity' and quicker creation of behavioural 'mass', lasting treatment outcomes are likely to occur quickly in programs designed using behavioural momentum principles, resulting in clinically important improvements far earlier than typical gambling treatments or even typical contingency management programs.

TRANSLATING BEHAVIOURAL MOMENTUM TO GAMBLING

Simply put, the idea of behavioural momentum is to apply reinforcement as densely as possible so the target behaviour gains sufficient 'mass' to overcome disruptors like environmental cues and drug-using peers. No knowledge of the formulae is required for a counsellor to introduce behavioural momentum principles into practice. Nevertheless, using behavioural momentum requires scheduling situations where the client can receive reinforcement in close succession. This ultimately means providing many small opportunities for the client to check in with their counsellor to provide evidence of gambling abstinence to receive a small reinforcer. This can be implemented in many ways, and is only restricted by the creativity of the counsellor. Obviously, three sessions a week where the client can provide evidence of gambling abstinence is possible, and desirable, but so are other procedures like SMS texts or phone calls from a designated significant other, or a secure internet site where clients can upload on-line banking or financial information for inspection. Once the evidence is verified clients can receive a small increment in reinforcement (e.g., an increase in credit on their vouchers).

CONCLUSIONS

Contingency management and behavioural momentum come from a discipline that investigates behaviour based on discriminative and temporal relations to consequenc-es. This approach assumes that behaviour is lawful and can be understood using scientific analyses. The practice of gambling also uses immediate relations, stimuli of various types, contingencies, and reinforcement. The similarities between these two areas of human behaviour are naturally cohesive and indicate close relationships between gambling, problem gambling, and treatment. They also indicate possible new ways of motivating gamblers to develop gambling abstinence that are likely to persist into the future.

For those who believe contingency management is too materialistic, other approaches are possible that might be more acceptable but still benefit from the forces of contingencies and behavioural mass. For example, providing reinforcers (e.g., praise, social support) that are sufficiently valuable to the gambler will be functionally equivalent as vouchers. Further, if these reinforcers were self-determined this is likely to be more agreeable to counsellors who prefer to use more 'self-aware' strategies. Nevertheless, what is crucial for these ideas is that the reinforcers (or whatever type) are of value to the gambler, are provided immediately on performance of the target behaviour, and are delivered at a sufficient rate.
REFERENCES


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APPENDIX 1

The change in behaviour using behavioural momentum theory is formally expressed in Equation 1:

\[ \Delta B = \frac{-x}{m} \]  

(1)

where \( \Delta B \) is the change in response rate (or ‘velocity’), \( x \) is the value of the disruptor, and \( m \) represents behavioural ‘mass’ or the subject’s history of reinforcement for the target behaviour. The negative sign next to the disruptor indicates the disruptor results in a reduction of the response rate of the target behaviour.

The application of behavioural momentum theory to quantitative data is typically a logarithmic ratio of the response rate during disruption, \( Bx \), over the asymptotic response rate, \( Bo \). Equation 2 illustrates the application of behavioural momentum theory to quantitative data:

\[ \log \left( \frac{Bx}{Bo} \right) = \frac{-x}{r^5} \]  

(2)

where experimental research suggests the behavioural ‘mass’ of a response rate is best described by a power function where \( m \) approximates \( r^5 \), where \( r \) is reinforcer rate. Essentially, the above formula is plotting the effect of increasing amounts of the disruptor on the target behaviour’s maximum response rate. Subsequent increases (i.e., in duration or size) in the disruptor are plotted as increasing decrements in the target behaviour’s response rate (See Figure 1).
Integrative Couple Treatment for Pathological Gambling / ICT-PG : Description of the Therapeutic Process

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ABSTRACT

Problem gambling can have profound consequences on a person’s life, consequences that range from financial, psychological to relational and that affect, in particular, couple relationships. Despite these widely documented relational consequences, most therapies for problem gambling favour an individual approach. Nonetheless, in the field of addiction, several studies have documented the efficacy of a couple approach. A few results from preliminary studies carried out with gamblers would seem to suggest that a couple approach might also be effective in this field. Our team thus developed the Integrative Couple Treatment for Pathological Gambling or ICT-PG, a therapy in which the treatment for pathological gambling starts by working with the couple from the very first meeting. First off, it targets the reduction or cessation of gambling behaviour, but also a reduction in the psychological distress of the two partners and an improvement in relationship satisfaction and mutual support. The usual work on diverse dimensions related to gambling is conducted with the gambler, and this in the presence and with the support of his partner. The treatment aims to eliminate those behaviours in the couple that might facilitate gambling and to reinforce behaviours that support the cessation of gambling. Another goal of the ICT-PG is for the couple to learn better skills for communication, conflict resolution, and mutual reinforcement, always with the objective of facilitating the reduction and cessation of gambling habits. This paper is a description of the therapeutic process of the ICT-PG.

Le jeu compulsif peut avoir de profondes conséquences sur la vie d’une personne, des conséquences qui vont de l’ordre financier, psychologique à relationnel et qui affectent, en particulier les relations de couple. Malgré que ces conséquences sur les relations soient bien connues, la plupart des thérapies pour le jeu compulsif emploient une approche individuelle. Pourtant, dans le domaine de la dépendance, plusieurs études ont démontré l’efficacité d’une approche de couple. Quelques données préliminaires d’études avec des joueurs compulsifs suggèrent qu’une approche de couple pourrait aussi être efficace dans ce domaine. Notre équipe a donc développé le Traitement de couple intégratif pour le jeu pathologique ou TCI-JP, une thérapie dont le traitement pour le jeu pathologique débute avec le couple dès la première rencontre. Tout d’abord, la thérapie cible une réduction ou cessation du comportement de joueur de même qu’une réduction de la détresse psychologique chez les deux partenaires, une amélioration de la satisfaction de la relation et un support mutuel. Le travail habituel sur les diverses dimensions liées au jeu compulsif est effectué avec le joueur en présence et avec le support du conjoint ou de la conjointe. Le traitement vise à éliminer les comportements du couple qui peuvent inciter à la pratique du jeu compulsif et à renforcer ceux qui mènent à une cessation. Un autre but du TCI-JP est de permettre aux couples de développer des compétences en communication, résolution de conflits et renforcement mutuel tout en maintenant l’objectif de faciliter la réduction et cessation des habitudes de jeu. Cet article décrit le procédé thérapeutique du TCI-JP.
Problem gambling leads to abundant suffering in gamblers and their partners, and greatly affects their relationship. Large gambling debts often trigger a crisis when the size of the problem is revealed to the family. This revelation is often a dramatic moment for the family, going so far as to cause posttraumatic stress symptoms. In addition to drawing the family into a financially precarious situation, gambling behaviour also has an impact on the physical, psychological, and relational health of the family members. Considerable consequences for the couple’s relationship have also been observed. Indeed, the anger, financial sacrifices, blame, feelings of guilt and betrayal, and loss of confidence that the partners feel are all elements that can undermine the couple relationship and the trust the two have in each other. Couples in which one of the two has a gambling problem also have more communication problems, a weaker dyadic adjustment, a less satisfying sex life, a higher rate of separation and divorce, and more cases of intimate partner violence (both perpetrated and endured) than do couples without a gambling problem.

Despite this considerable impact on couples where one member has a gambling problem, there have been few treatments developed to specifically target this aspect. That being said, the efficacy of couple treatments where one of the members has problems with alcohol or illegal drug use has been clearly demonstrated with regard to the reduction and cessation of substance use as well as problem resolution skills. The literature concerning unilateral treatment for close relatives of drug addicts has yet been conducted comparing the efficacy of a couple treatment to that of an individual treatment for pathological gamblers.

With this in mind, our team developed the Integrative Couple Treatment for Pathological Gambling or ICT-PG in partnership with a clinical team from diverse treatment centres for pathological gamblers in Quebec. The model was developed using iterative interaction between a literature review (i.e., research on couple treatment for addiction and general couple treatments) and clinical endeavours to apply several of these strategies by four therapists working with eleven couples, one of whom was a pathological gambler. Several of these treatment techniques were incorporated into our model and reviewed by the clinical research team so as to judge their relevance all throughout the 18 months of the study. The study led to the writing up of a treatment guide for the Integrative Couple Treatment for Pathological Gambling / ICT-PG.

The initial elements included in the ICT-PG come from classic couple treatments that have already demonstrated their efficacy, namely the increase in mutual reinforcement and the improvement of communication and problem resolution skills. The literature concerning unilateral treatment for close relatives of drug addicts, as well as our early experimentation with the ICT-PG with couples, persuaded us to integrate techniques that reinforce behaviours in non-gamblers which support the cessation of gambling and, conversely, discourage those behaviours that facilitate the continuation of gambling. Such highly recommended techniques as progress monitoring, which give regular feedback to participants regarding their treatment evolution, are also comprised in the ICT-PG.

* Two linguistic choices were made to facilitate the reading of this text, namely: 1) The expression “pathological gambler” designates the person in the couple relationship, man or woman, who had major difficulties with gambling; the term “partner” thus designates the person, man or woman, who did not have at risk gambling behaviours. 2) Because of the fact that, in approximately 70% of the cases, the person in the relationship with pathological gambling behaviour was the man, and so as to avoid the cumbersome repetition of he/she and his/her throughout the text, he refers to the gambler and she to the partner.

† A randomized efficacy study is underway with pathological gamblers who are beginning their treatment. The goal is to compare the efficacy of the ICT-PG to individual treatment: the results will be available in 2017.‡ The ICT-PG treatment guide is available in French and English from the author.
The concept of therapeutic alliance in the context of couple or family treatments was added, as was the notion of acceptance in which members of a couple are encouraged to learn how to live with such non-modifiable behaviours in the spouse as personality traits. Finally, some authors have postulated that behavioural changes are not enough and that we must search for the meaning attributed to these behaviours if we are to facilitate change, particularly with regard to one's personal narrative. This postulate is shared by practitioners of both psychodynamic and cognitive approaches. These evolutions in clinical couple treatment, which draw their inspiration from diverse theoretical models, were incorporated in the ICT-PG, hence the word “integrative” in the treatment’s name. It is worth noting that, despite these additions, the treatment is founded on a cognitive behavioural base, in the sense that the first objective of the treatment is behavioural change.

**TREATMENT STRATEGIES AND ELEMENTS OF THE CLINICAL PROCESS**

The ICT-PG borrows first of all from the Alcohol Behavior Couple Therapy – ABCT, which proposes a couple approach as the only treatment, and this from the very first meeting with the alcoholic or drug addict. This couple-only approach was considered to be an essential characteristic for the ICT-PG as concerns the services offered to pathological gamblers, since finding a second therapist for couple therapy is particularly complex when organizing care services.

The ICT-PG takes place in 90-minute meetings, which makes it possible to combine work with the gambler and the couple in the same session. The number of sessions varies between eight and twelve meetings, but there can be more if needed. As proposed by McCrady and Epstein (2009), this type of treatment has three goals, namely work with the gambler, his partner, and the couple as a whole. A portion of each of these meetings is devoted to individual work with the gambler in the company of his partner; this lasts approximately 45 minutes to one hour but diminishes as the gambler reduces his gambling behaviour. During the first section, the therapist incorporates the partner into the treatment, inviting her to express her point of view, while maintaining the focus on the gambling behaviour. The second portion of the meeting addresses relationship aspects of the situation (increased mutual reinforcement, improvement of communication and negotiation skills) as well as partner-related elements (behaviours that facilitate gambling and those that reinforce its cessation). The partner can express her viewpoint, emotions, and experiences with regard to the gambler all throughout the process. Table 1 illustrates the sequence of therapeutic work in the ICT-PG.

**THE GOALS OF THE ICT-PG**

The first goal of the ICT-PG is to reduce or stop gambling behaviour through couple treatment. That being said, given that gambling behaviour has a major impact on the quality of a love relationship and the well-being of the two members, the ICT-PG also aims to reduce psychological distress and to improve the two partners’ well-being, their relationship satisfaction, and their mutual support for each other. It is postulated that better relationship satisfaction will contribute to reducing the probability of a gambling relapse.

**ASSESSMENT**

Before beginning the therapeutic process, the two members of each couple answered a series of questions so as to assess the gambling habits and severity, (e.g., Gambling Symptom Assessment Scale), mental health problems (e.g., Center for Epidemiologic Studies – Depression Scale), treatment history for gambling and mental health problems, alcohol and other drugs use and abuse and relational dimensions (e.g., Dyadic Adjustment Scale – 4). A summary of the results was then produced for each member and presented to the couple during the first two meetings. A portion of the questionnaires was likewise administered at each encounter so as to provide regular and brief feedback all throughout the therapeutic process concerning the therapeutic alliance and clinical progress (gambling behaviour, psychological distress, and relationship satisfaction).

**INITIAL COMMITMENT TO THE TREATMENT AND BASIC RULES**

The two members of the couple were asked, from the very first meeting, to follow a few rules that would create an atmosphere that was favourable and optimal for therapeutic work. First of all, the therapists asked the members of the couple not to threaten to separate during the treatment period. This threat would undermine any effort to rebuild a relationship. Second, the use of verbal violence (e.g., putdowns) and physical violence had to be put aside as an ineffective form of self-expression.
Finally, the two members were asked to attend all the meetings, to participate actively, and to do the required exercises at home.

TIMING

The ICT-PG proposes different exercises and areas for the gambler, his partner, and the couple to work on, all of this in a certain order. Nonetheless, we considered that therapists are the first judge of the timing of exercise. As such, even though the ICT-PG proposes that partner behaviour which contributes to continued gambling be discussed in the sixth meeting, it was sometimes necessary to discuss this question in the first meetings. The therapists based their work on the initial assessment, the needs of the participants, and on their positive or negative response to work conducted in the previous meeting to identify the dimensions to be discussed and the length of time they required. Depending on clinical needs, several sessions could be devoted to one topic, e.g., decreasing gambling behaviour, improving communication skills, etc.

THERAPEUTIC ALLIANCE

Therapists are sensitive to the issues of each one of their patients. The concept of multidirectional partiality illustrates this idea which states that the practitioner takes each person’s side, but never to the detriment of the other member of the couple. On the one hand, therapists hear the anger and frustration of the partner (betrayal, financial debt) and support the partner’s courage to participate in the therapeutic process. And on the other hand, despite all the harm caused, therapists hear the gambler’s desire to come to the treatment sessions and recognize his distress and fear of honesty. Therapists thus “pick sides” with both members of the couple.

Therapists must not forget that there is an entity in front of them that is not the simple sum of the two people making it up, namely the couple. The couple is the product of tacit, inexplicit agreements, of mutual, sometimes maladjusted projections, of psychic concessions, and of expected dividends. Therapists know that the couple can always unite against them if they threaten tacit relationship contracts. Therapists must also remember that people’s passiveness regarding certain exercises can stem from their fear of calling these tacit agreements into question.

WORK WITH THE GAMBLER

The therapists working with the ICT-PG had already received training for pathological gambling treatments. The current guide does not describe these treatment techniques, which are well described in well-known summaries. During the first part of each treatment sessions (30 to 60 minutes), the therapists worked with the gambler as if it was an individual session but with the partner present, integrating the latter’s comments into the treatment where relevant.

WORK WITH THE COUPLE

Mutual reinforcement

The goal of this type of classical cognitive behavioural technique is to increase positive behaviour between the two members of the couple. It is based on the observation that distressed couples tend to reduce or eliminate mutual reinforcement (Gottman & Schwartz Gottman, 2008). Different activities are proposed such as “List of pleasant activities for my partner”, “The Caring Day”, or “Catch you partner doing something nice” where the goal is to increase the pleasure of being together.

Communication skills and structured dialogue practice

Training for communication skills and problem solving is a fundamental characteristic of cognitive behavioural therapy for couples as well as of models adapted for couples in which one member suffers from alcohol or drug addiction.

Communication skills were addressed early in the therapeutic process so that they could be applied to various situations. This practice enhanced mutual understanding and thereby made it easier to find solutions to their difficulties through behavioural changes and mutual acceptance. The training for better communication skills came from a French model called “Le dialogue structuré” (structured dialogue).

CENTRAL THEMES

There were some central, recurrent themes in the ICT-PG that emerged constantly. First of all, practitioners had to help the gambler to talk about his desire to gamble and his potential relapses while helping the partner...
listen constructively. This practice became a useful tool for preventing relapses. In the rare situations where the partner could not tolerate the gambler talking about his desire to gamble, it was important to find another confidant for the gambler⁴.

The second recurrent theme concerned the gambler’s impression of being controlled by his partner. Indeed, the non-gambling partner attempted to take control of her life by being more vigilant about the gambling behaviour of her partner. She would express her worries or anger when expenses were higher than foreseen or when the gambler did not phone to say that there had been a change in his work schedule, leading her to believe that he had gone gambling. As for the gambler, he often expressed feelings of anger about this new relational mode of interaction.

A third recurrent theme among the non-gambling partners was the impression of being betrayed that resulted from the hiding of gambling habits and financial losses. Even when couple members have independent financial accounts, the problematic behaviour of the gamblers can affect, to a lesser degree, the partner. This state of affairs had to be expressed and heard by the gambler. This inevitable path made it possible to progressively rebuild trust, primarily through the numerous exchanges where the gambler talked frankly about his desire to gamble and his potential gambling relapses.

WORK WITH THE PARTNER

FACILITATION AND REINFORCEMENT

This work involved helping the non-gambling partner to both reduce behaviour on her part that could inadvertently facilitate gambling habits and to increase and learn new behaviour that reinforced the cessation of gambling. We postulated that some partners adopted behaviour that facilitated the continuation of gambling, for example by going out in the evening to places where there were VLTs, organizing parties at their home where there was gambling, and expressing great satisfaction with monetary gains from gambling. Sometimes partners prevented gamblers from experiencing the natural negative consequences of their behaviour, for example by reimbursing their gambling debts or buy lending them money, thus depriving them of an important source of learning⁵. Even though this behaviour was not necessarily intended to reinforce gambling, this was probably the effect that it had⁶.

At no time was it postulated that the partners wished, either consciously or unconsciously, to reinforce gambling habits. Our team did not incorporate the notion of codependence, primarily employed in alcoholism, which holds that the partner (unconsciously) needs a weak dependent spouse in order to fulfill the need to take care of or dominate someone⁶. Moreover, the concept of codependence has been widely criticized, particularly with respect to definition problems and weak empirical support⁶. The essential idea underlying the ICT-PG is to reduce, as postulated in the Community Reinforcement Approach⁸, all reinforcement for gambling behaviour in the gamblers’ environment, especially those environments that are controlled by the partners.

To do so, we began by helping the partners name situations in which gambling behaviour was reinforced. Consequently, a questionnaire was developed by the research team that served as a starting point for the therapists⁹. The goal was to have a non-judgmental discussion with the non-gambling partners to identify which of their strategies might have facilitated gambling behaviour.

The issue of behaviour that reinforced gambling cessation was then discussed⁹. It was important that the partner encourage the gambler when he succeeded in not gambling, listen when he expressed a desire to gamble, help him look for gambling incompatible activities, and support him with regard to money management. These activities were numerous and specific to each gambler. This crucial work on behaviours that contributed to the gambling problem and those that facilitated its cessation was always conducted in the presence of both members of the couple.

CONCLUSION

The ICT-PG is a treatment that adapts well to service structures where there are few available practitioners. Among the requests for specialized addiction services for pathological gamblers, it is reasonable to estimate that 10 to 25% of gamblers could benefit from the ICT-PG or other couple therapies. In order to validate the relevance of this type of treatment, future studies should evaluate whether the ICT-PG is more effective than a traditional treatment. Several variables must be considered in the efficacy evaluation of ICT-PG, such as perseverance, gambling habit reduction, individual and relational well-being. Particular attention should be paid to those ICT-PG elements that are most likely to foster change. It would likewise be interesting to document which elements are favourable for implementing the ICT-PG, such as practitioner characteristics and the time and conditions needed.

¶ The confidant is not invited to treatment sessions.
for training. The ICT-PG is in its first stages of clinical and scientific evaluations. That being said, similar treatment models have shown quite encouraging results in the field of addiction, and many studies examining the positive contribution of family and friends in addiction treatment have also shown positive results. Based on these observations, the ICT-PG shows promise as a way of improving treatment for gamblers by including partners.

**REFERENCE LIST**

TABLE 1. Sequence of the Integrative Couple Treatment for Pathological Gambling (ICT-PG)

<table>
<thead>
<tr>
<th>Session No.</th>
<th>The gambler</th>
<th>The partner</th>
<th>The couple</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 and 2</td>
<td>• Define the request</td>
<td>• Define the request</td>
<td>• Improve mutual reinforcement</td>
</tr>
<tr>
<td></td>
<td>• Listen to each person’s expectations / preoccupations</td>
<td>• Listen to each person’s expectations / preoccupations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Set down general objectives of the meeting</td>
<td>• Set down general objectives of the meeting</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Give feedback on test results</td>
<td>• Give feedback on test results</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Set rules / expectations for the participants</td>
<td>• Set rules / expectations for the participants</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Verify recent gambling behaviour</td>
<td>• Verify recent gambling behaviour</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Stop the financial haemorrhage</td>
<td>• Stop the financial haemorrhage</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Conduct functional analysis of gambling behaviour / risk situations</td>
<td>• Conduct functional analysis of gambling behaviour / risk situations</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>• Conduct clinical work on gambling</td>
<td>• Improve mutual reinforcement</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>• Conduct clinical work on gambling</td>
<td>• Improve communication skills</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>• Conduct clinical work on gambling</td>
<td>• Improve communication skills</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>• Conduct clinical work on gambling</td>
<td>• Eliminate gambling facilitation situations</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>• Conduct clinical work on gambling</td>
<td>• Eliminate gambling facilitation situations</td>
<td>• Reinforce non-gambling situations</td>
</tr>
<tr>
<td>8</td>
<td>• Conduct clinical work on gambling</td>
<td>• Reinforce non-gambling situations</td>
<td></td>
</tr>
<tr>
<td>9 to 12+</td>
<td>Meetings nine and over continued the work of the previous meetings. The therapist might take more time on one element or another. The total number of meetings can go well beyond twelve. The criteria for determining the number of sessions is the clinical progress and, ultimately, the achievement of the therapeutic goals.</td>
<td>• Reinforce non-gambling situations</td>
<td></td>
</tr>
</tbody>
</table>

This table is inspired from the work of McCrady and Epstein 30.
Cognitive and Neurobiological Aspects of Problem Gambling: Relevance to Treatment

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ABSTRACT

Problem gambling (formally termed Gambling Disorder) is recognized as the first behavioural addiction in the DSM-5. Research on cognitive and neurobiological differences in individuals with gambling problems was instrumental in this reclassification decision. Problem gambling is also increasingly acknowledged to be a heterogeneous disorder, with respect to gambling motives, aetiological subtypes, and differences between gambling forms. The purpose of the current article is to consider how research on the cognitive and neurobiological aspects of problem gambling can impact upon treatment decisions made in clinical practice. We highlight three examples. First, we consider the potential for personalized or tailored interventions based upon individual differences, using the specific example of impulsivity, a cognitive trait that reliably predicts poorer treatment outcomes in problem gamblers. Second, we discuss recent advances in understanding the neurochemical basis of problem gambling, primarily with respect to dopamine transmission and some novel targets for medication development indicated by animal models of gambling. Third, we review recent work on gambling-related cognitive distortions that highlights a neglected role for the insula, and points toward possible insula hyperactivity in problem gamblers, with implications for new forms of treatment including mindfulness training. It is argued that neurobiological research on gambling disorder lays a foundation for enhancing both psychological and pharmacological approaches to treatment.

Keywords: gambling, addiction, impulsivity, dopamine, cognitive therapy.

Le jeu compulsif (formellement appelé le jeu pathologique) est la première dépendance comportementale du DSM-5. Les travaux de recherche sur les différences cognitives et neurobiologiques chez les personnes ayant des problèmes de jeu ont influencé le reclassement de ce trouble. Le jeu compulsif est de plus en plus reconnu comme un trouble hétérogène qui a trait aux motifs, aux sous-types étiologiques et aux différences entre les formes de jeu. L’objectif de cet article est d’examiner comment la recherche sur les aspects cognitifs et neurobiologiques du jeu compulsif peuvent influencer le choix de traitement en pratique clinique. Nous présentons trois exemples. Premièrement, nous considérons le potentiel d’interventions personnalisées ou adaptées aux différences individuelles en utilisant l’exemple de l’impulsivité, un trait cognitif qui prédit de façon fiable de moins bons résultats de traitement chez les joueurs compulsifs. Deuxièmement, nous discutons des progrès récents dans la compréhension des fondements neurochimiques du jeu compulsif, en particulier sur la transmission de dopamine et de nouvelles cibles pour le développement de médicaments identifiées chez les modèles animaux du jeu pathologique. Troisièmement, nous passons en revue les travaux récents sur les distorsions cognitives liées au jeu qui mettent en lumière le rôle négligé de l’insula et qui suggèrent une hyperactivité de l’insula chez les joueurs compulsifs. Ces travaux pourraient avoir des implications sur le développement de nouvelles formes de traitement dont l’entraînement à la pleine conscience. Nous avançons que la recherche neurobiologique sur le jeu pathologique jette les bases pour une mise en valeur des approches thérapeutiques tant psychologiques que pharmacologiques.

Mots clés: jeu de hasard et d’argent, dépendance, impulsivité, dopamine, thérapie cognitive.
INTRODUCTION

When ‘compulsive gambling’ (later termed ‘pathological gambling’) was introduced in the 3rd edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III) in 1980, it was initially classified within the Impulsive Control Disorders category. In the recent edition of the DSM-5, the condition, now termed Gambling Disorder, was reclassified alongside the substance use disorders in a category labelled ‘Substance-Related and Addictive Disorders’. The shift in classification effectively recognized Gambling Disorder as the prototype for the behavioural addictions; it is the only condition in this category that does not involve the administration of an exogenous substance. The DSM-5 decision was driven by several lines of research, including overlap in the clinical features, patterns of comorbidity, research on heritability, and effective treatments, as reviewed in Potenza and Leeman and Potenza. Arguably the largest area of research that informed the decision was work characterizing the neuropsychological and neurobiological profile of problem gambling, and comparing and contrasting this profile with established effects in substance use disorders. As the present article will refer mostly to research conducted pre-DSM-5, we will use the term ‘problem gambling’ throughout, as an umbrella term for individuals experiencing clinical or subclinical levels of gambling harm.

This article also accepts a growing consensus that problem gambling is a heterogeneous and multiply-determined disorder. Recognizing and characterizing this heterogeneity at a psychological and neurobiological level will enable a shift from traditional ‘one size fits all’ treatments towards evidence-based personalized or tailored interventions. For problem gambling, this shift was inspired by the Pathways Model by Blaszczynski and Nower, which proposed three discrete subtypes of problem gambling, linked to the behavioural conditioning of wins (Pathway 1), mood disorder comorbidity and negative reinforcement (Pathway 2), and executive dysfunction and impulsivity (Pathway 3). This model remains – at the very least – a useful and influential heuristic, now complemented by work dissociating coping, enhancement and social motives in gamblers, and studies linking electronic gambling machines (EGM) in particular to distraction / escape from reality.

In the sections that follow, we will focus on three specific examples, where in each case, we aim to concisely describe the underlying cognitive or neurobiological effects, and we will then elaborate upon the significance of these findings for improving existing treatment mechanisms and/or the development of novel treatment mechanisms.

IMPULSIVITY AS A MARKER OF TREATMENT COURSE

Impulsivity was initially described as a personality trait in the 1950s, referring to the tendency to make hasty or unplanned responses, with the potential for negative consequences. In the past decade, considerable research has been invested in developing behavioural measures of impulsivity using neurocognitive tests to complement research using self-report measures. There is ongoing debate about the degree of convergence between these measures, and the underlying factorial structure of impulsivity. It is beyond doubt that problem gamblers display elevated levels of impulsivity across many of the existing measures. Using questionnaire measures, significant elevations were reported on the Eysenck Impulsivity Scale, the Barratt Impulsiveness Scale and the UPPS impulsivity scale.

In the neurocognitive field, researchers increasingly distinguish between two forms of impulsivity, referred to as ‘impulsive action’ and ‘impulsive choice’. Impulsive action refers to the capacity to inhibit an automatic or prepotent response, as on the go/no-go task or stop-signal task. Impulsive choice refers to the tendency to select options that are superficially or immediately rewarding at the cost of longer-term consequences, or without adequate reflection. Problem gambling is associated with larger and more robust disturbances in impulsive choice. For example, steeper rates of ‘delay discounting’ are observed in problem gamblers compared to healthy controls. Impulsive choice was also evident in less-severe, community-recruited gamblers, on the Cambridge Gamble Task (probing decision-making under risk) and the Information Sampling Test (a test of ‘reflection impulsivity’ that measures the tendency to gather and evaluate information before making a decision).

In addition to impulsive choice, signs of impulsive action are observed in more severe, treatment-seeking groups of problem gamblers. For example, a large-scale study by Odlaug et al. found significant impairments in stop-signal response inhibition in pathological gamblers,
but no differences between ‘at risk’ gamblers and non-gamblers. Other studies have also indicated that less severe groups of problem gamblers do not show statistically significant differences in stop-signal performance\(^\text{a}\). The continuous nature of these inhibitory control abilities was underscored in a recent study of 75 regular gamblers\(^\text{b}\), who completed a stop-signal task as well as a simulated slot machine task that included an extinction phase, where the participant would encounter no further wins and could quit the task at any point. Across the sample, gamblers who had poorer inhibitory control (slower stop-signal reaction times) tended to persist for longer on the slot machine task. Severity of gambling symptoms, as measured by the South Oaks Gambling Screen (SOGS), also significantly predicted persistence.

Within the measures of self-report impulsivity, ‘Urgency’ is a key facet, describing the tendency toward impulsive behaviours during intense mood states\(^\text{c}\). Derived from the multi-factorial ‘UPPS’ scale, two studies reported robust increases in Urgency in problem gamblers compared to healthy control groups\(^\text{d}, \text{e}\). While statistically-significant increases were observed across several impulsivity subscales, the effect sizes were greatest (Cohen’s \(d > 1.0\), indicating large effects) for Urgency (see Figure 1). By extrapolation, problem gamblers may experience particular difficulties in controlling impulses to gamble during strong affective states. Such states occur frequently during gambling sessions, in the euphoria associated with major wins, or the disappointment associated with a bad beat or near-miss. Gambling also serves as a potent means of regulating negative emotional states like stress, depression or boredom. These ‘coping motives’ are predictive of problematic gambling\(^\text{f}\) and constitute the emotional vulnerability pathway in the Blaszczynski and Nower\(^\text{g}\) model. These recent findings for the urgency facet highlight the need for an emotional regulation component in psychological therapy for problem gambling.

How else might these findings of heightened impulsivity be of clinical utility? Here, individual differences in impulsivity within a group of problem gamblers become important. One line of research has looked at the relation between impulsivity and the psychological distortions that players experience during play, such as the ‘illusion of control’ and the ‘gambler’s fallacy’. In a treatment-seeking sample of pathological gamblers, there was a strong relationship between delay discounting tendencies as a measure of impulsive choice, and scores on the Gambling-Related Cognitions Scale\(^\text{h}\) (see Figure 1). Given that impulsivity is a stable trait that can act as a precursor to a range of addictive behaviours, one could hypothesize that impulsivity as a broad cognitive style renders ‘at risk’ gamblers more vulnerable to the (proximal) erroneous cognitions that drive risky behaviors like loss-chasing within an actual gambling session.

A more extensive line of investigation has looked at the impact of impulsivity on the course of treatment, and longer-term treatment outcomes, in problem gamblers. The intuitive idea behind these studies are that impulsivity may moderate the client’s ability (or willingness) to prioritize the long-term benefits of treatments over the immediate emotional consequences of gambling. In the first study to examine this, higher scores on the Eysenck Impulsivity Scale at intake into psychological treatment significantly differentiated those who completed treatment from those who dropped out\(^\text{i}\). Recent work confirmed that behavioural measures, including the Iowa Gambling Task as a measure of impulsive choice, also predicted higher risk of dropout\(^\text{j}\). Other studies have monitored medium-term treatment outcomes over 6 to 12 months, including relapse, and changes in gambling expenditure and gambling frequency\(^\text{k}, \text{l}\). Poorer outcomes were associated with higher scores on both self-reported measures of impulsivity, and behavioural measures (Stop Signal Task and Card Playing Task). These results for problem gambling converge with similar data in the substance use disorders\(^\text{m}\). Critically, these observations begin to establish a rationale for personalized or tailored interventions for problem gambling\(^n\): as clients enter treatment, cognitive screening could be used to direct clients with higher levels of impulsivity into more intensive modes of treatment, such as residential care, individual as opposed to group therapy, or – potentially – augmentation with pharmacotherapy.

**DOPAMINE AND MEDICATION DEVELOPMENT**

Comparisons between problem gambling and substance use disorders fuelled interest in examining the neurochemical underpinnings of problem gambling, with an initial focus on the mesolimbic dopamine system. Dopamine plays a central role in contemporary neuroscience accounts of addiction\(^\text{o}\). In clinical research using [\(^{11}\text{C}\)]raclopride positron emission tomography (PET), dopamine D\(_2/D_3\) receptor availability was decreased in substance abusers across a variety of different preferred drugs, including stimulants\(^\text{p}\) and alcohol\(^\text{q}\). This measure of baseline [\(^{11}\text{C}\)]raclopride binding is assumed to largely reflect D\(_2/D_3\) receptor density, but PET can also be used to quantify dopamine release by comparing [\(^{11}\text{C}\)]raclopride binding before and after challenge with a stimulant drug, either amphetamine or methylphenidate. With
this protocol, stimulant abusers reliably show attenuated dopamine release\textsuperscript{30, 31}.

Recent studies have begun to examine these PET markers of dopamine transmission in problem gambling. The results point to some provocative discrepancies from the established signature in substance use disorders. A series of independent studies with the \textsuperscript{[11C]}raclopride tracer failed to detect any overall group differences between problem gamblers and healthy controls in dopamine receptor availability. Some individual differences were reported: problem gamblers with greater levels of trait impulsivity\textsuperscript{32} and symptom severity\textsuperscript{33} showed reduced dopamine receptor binding. In terms of dopamine release, preliminary studies indicate increased dopamine release in problem gamblers, either as an overall group effect in a study using amphetamine challenge\textsuperscript{34} or as a function of subjective excitement or gambling severity in studies measuring gambling-induced dopamine release\textsuperscript{35–36}.

This characterization of neurotransmitter function directly informs the development of medications for problem gambling; at the current time, there are no licensed forms of pharmacotherapy for this disorder. Notably, clinical trials with olanzapine, a dopamine D2 antagonist and widely-used antipsychotic medication, indicated limited efficacy over placebo\textsuperscript{37–38}. In the \textsuperscript{[11C]}raclopride PET study in problem gamblers by Clark et al.\textsuperscript{39}, the observed relationship between D2/D3 receptor availability and mood-related impulsivity (Urgency) provides a rationale for exploring differential effects of dopamine-based medications in groups of problem gamblers stratified by impulsivity scores. In an example of this approach by Zack and Poulos\textsuperscript{40}, the atypical stimulant drug modafinil was found to reduce urges to gamble and attention to gambling stimuli in high-impulsive problem gamblers, but not in a low impulsive group. Such studies highlight again how improved understanding of individual differences, especially with regard to impulsivity, may provide a basis for tailored intervention. Medications that reduce impulsivity in other forms of mental illness may also constitute promising avenues for pharmacotherapy. Methylphenidate and atomoxetine are particularly effective at reducing impulsive action in the context of Attention Deficit Hyperactivity Disorder\textsuperscript{41–43}. Selective Serotonin Reuptake Inhibitors (SSRIs) have also shown efficacy in treating problem gambling\textsuperscript{43–44}, and could be further examined in specific relation to impulse control outcomes.

Another set of clues has emerged from Parkinson’s Disease, a neurological syndrome associated with degeneration of ascending dopaminergic neurons. A number of dopamine agonist medications used in the treatment of Parkinson’s Disease, including pramipexole, have been linked to the emergence of excessive gambling as a side-effect (45). These medications have high affinities for the dopamine D3 receptors, which are densely located in nucleus accumbens and caudate/putamen. In fact, the PET study that provided the strongest indication of elevated dopamine release in problem gamblers also used a D3-preferent radiotracer \textsuperscript{[11C]}PHNO\textsuperscript{33} as opposed to the mixed D2/D3 ligand \textsuperscript{[11C]}raclopride. A pharmacological fMRI study in patients with Parkinson’s Disease also found that pramipexole administration modulated brain activity in striatum and medial prefrontal cortex during a delay discounting task (measuring impulsive choice, see above) but not during an impulsive action task\textsuperscript{46}. As selective dopamine D3 antagonists move through early phase clinical trials, gambling disorder clearly represents a logical target for these medications.

Research on experimental animals provides further insights for drug discovery. In a powerful example of translational medicine, Lobo et al.\textsuperscript{47} compared 38 genetic polymorphisms implicated in addictions between 400 problem gamblers and 385 healthy participants; genes that differed in frequency between the two groups were then followed up in a rodent experiment where mRNA expression was correlated against risky choices on the ‘rat Gambling Task’, a widely used analogue of the human ‘Iowa Gambling Task’ (see Zeeb et al.\textsuperscript{48}). The only convergent effect across both the human and rodent arms was in the dopamine D3 receptor gene. Other studies have begun to adapt decision-making tasks to look at some of the specific cognitive biases seen in problem gamblers (see below). In the rodent ‘slot-machine’, the rat makes a series of responses to flashing lights above 3 nose-poke apertures (akin to the reels). If all 3 lights illuminate, the rat can collect a sugar pellet treat by pressing a separate lever in the back wall of the cage, but if this collect response is made on other trials (when only 0, 1 or 2 lights illuminate), the rat incurs a timeout penalty. Rats make a substantial number of punished collect responses when 2 of 3 lights are lit – analogous to the human ‘near-miss’ effect (see below). The mixed dopamine agonist quinpirole increased these responses, which were further modulated by a D4 receptor antagonist that also blocked the quinpirole effect\textsuperscript{49}. These data
raise an exciting possibility that existing drugs with D4 affinity, or novel selective D4 agents, could have future benefit in treating problem gambling.

THE ROLE OF THE INSULA IN GAMBLING DISTORTIONS

Functional neuroimaging of gambling tasks implicates a network of regions as underlying reward-based decision-making and reinforcement learning, comprising the ventral striatum (nucleus accumbens), ventromedial prefrontal cortex and a number of affiliated regions. This ‘brain reward system’ is recruited across many forms of appetitive task and modulated by drugs of abuse. The differential roles of the various nodes in this network are less clear. A recent study in patients with focal brain injury provided an opportunity to examine the contributions of the ventromedial prefrontal cortex, insula and amygdala. The participants performed a slot machine task and a roulette task. On the slot machine task, participants received a win when the two reels aligned, and when the reels misaligned, we distinguished ‘near-miss’ and ‘full-miss’ outcomes. Taking ratings after each trial, most participants showed an increase in their desire to continue the game (an index of motivation) following near-misses. This effect was absent in the group with insula damage (see Figure 3). The same pattern was observed on the roulette task, where participants guessed red or blue before each spin. In healthy participants, the gambler’s fallacy is manifested as the tendency to avoid a colour after an increasing run of that colour. This effect was also selectively abolished in the group with insula damage.

What role might the insula be playing in these gambling games? The insula has key functions in the sensory coding of visceral, internal stimuli, and their translation into conscious feelings, i.e. ‘interoception’ as bodily awareness. Interoceptive processes are increasingly recognized in substance use disorders: drug administration generates strong internal sensations, for example, the airway effects of inhaling cigarette smoke are initially unpleasant, but become conditioned as pleasant through repeated pairing with the reinforcing effects of smoking. Over time, these interoceptive signals generate urges and cravings. In a precursor to our lesion study, regular smokers who sustained insula stroke were more likely to spontaneously quit smoking, and reported a cessation of smoking urges. The insula is also reliably activated by cue reactivity tasks using fMRI. Within this framework, addictive disorders are not due simply to the over- or under-activity of the insula, but may occur as a result of the insula ‘tuning’ the balance between interoceptive and external information (e.g. environmental cues).

These interoceptive processes are clearly relevant to gambling behavior. Gambling is an exciting and physiologically-arousing activity, as seen in naturalistic studies in casinos where gamblers display dramatic increases in heart rate, cortisol release, and beta-endorphin during gambling sessions. Using phasic monitoring of skin conductance and heart rate levels during a simulated slot machine game, we can also see physiological fluctuations in response to winning and near-miss outcomes. In light of these various manifestations of physiological arousal, research on interoceptive processes pertaining to the awareness and subjective experience of this arousal may prove fruitful in problem gambling.

The gambling distortions that were attenuated in our insula-damaged patients in the lesion study appear to be elevated in clients with gambling problems, who display increased sensitivity to near-misses and the gambler’s fallacy. Thus, a logical hypothesis is that hyperactivity of the insula may underlie the increased susceptibility of problem gamblers to cognitive distortions. Recent neuroimaging experiments provide tentative support for this prediction. In a study using functional MRI and magnetoencephalography (MEG), both imaging modalities converged on the finding that wins and near-misses recruited similar brain circuitry, including the insula and right inferior frontal gyrus, and the MEG results showed that the insula response to near-misses was positively associated with gambling severity. Fauth-Bühler et al. showed greater insula activation on an effort-based reward task in only those problem gamblers with higher levels of comorbid depression, and another study showed positive correlations between reward-related insula responses and gambling severity. Nevertheless, Tsurumi et al. showed decreases in insula activity as a function of illness duration, so the direction of change is not consistent. Crucially, none of these neuroimaging studies have used tasks designed to elicit cognitive distortions and/or cravings, the specific factors associated with insula involvement.

If our hypothesis of insula hyperactivity is substantiated, it will point to some exciting new avenues for treatments, aimed at re-tuning insula engagement. For example, meditation training alters both activity and connectivity of the insula, and has beneficial effects in anxiety and mood disorders. Experienced meditators showed altered recruitment of anterior and posterior insula during an economic decision-making task, the Ultimatum Game. Meditation is itself a central component of mindfulness-based therapy, a promising new form of treatment for problem gambling that can...
be applied as part of traditional Cognitive Behavioural Therapy (CBT). Mindfulness-based cognitive therapy aims to enable gamblers to become more aware of bodily responses triggered by gambling, and to recognize and cope with those responses more effectively. By emphasizing the acceptance of these physiological responses, mindfulness training contrasts with other treatment approaches that advocate the suppression of such responses; this may be challenging for many clients given that money and games of chance are unavoidable, highly-conditioned appetitive stimuli. In one of the first controlled studies of mindfulness-based training for problem gambling, clients showed a marked reduction in gambling severity and urge to gamble at treatment end and 3-month follow-up compared to a (non-randomized) waiting list control group.

CONCLUSION

At the current time, CBT is the first-line treatment for problem gambling in most jurisdictions where treatment is available. A recent meta-analysis of clinical trials on psychological treatments for problem gambling concluded that CBT yielded moderate efficacy, but with considerable room for improvement. While it may be naïve to expect any psychiatric treatment to benefit all clients, we propose that cognitive neuroscience research can inform the tailoring of treatments. Clients displaying, for example, high impulsivity or low baseline dopamine receptor levels, may benefit from more intensive treatments or augmentation with pharmacotherapy. Cognitive neuroscience research can also tackle clinical problems that cut across all clients. For example, the restructuring of cognitive distortions that is a key ingredient of CBT is typically hindered by the context-driven nature of these distortions: many gamblers can think quite rationally about gambling in a cold, clinical environment free of conditioned cues, but switch into a more distorted state when they re-enter the gambling environment. Understanding this switching process in terms of how conditioned associations affect decision-making and impulse control may provide a means of enhancing cognitive therapy. Finally, we should acknowledge the question-marks that remain over the underlying nature of behavioural addictions: future additions to the new DSM-5 category, like internet gaming disorder or binge eating, may provide further opportunities for treatment translation.

Clinician take-home messages:

- More impulsive clients with addictions often experience poorer treatment outcomes. Look out for indicators of impulsivity at intake and consider more intensive options for such clients.
- Problem gamblers experience the greatest difficulties with impulse control during emotional states (‘urgency’). Emotion regulations are an important component of psychological treatments.
- Physiological arousal is an important motive for many gamblers. Mindfulness-based techniques help the client become more aware of these bodily responses, and provide some insight on how such arousal influences their risk-taking or urges.

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FIGURE LEGENDS

**Figure 1.** A) The UPPS-P Impulsivity Behavior Scale comprises 5 facets: ’Urgency’ (mood-related impulsivity) is further separated into Negative Urgency (i.e. low mood), and Positive Urgency (i.e. high mood); Lack of Premeditation; Lack of Perseverance; and Sensation Seeking. While problem gamblers show significantly higher scores on all facets besides Sensation Seeking, the effect sizes are notably stronger for the two Urgency facets. B) In the same dataset, the degree of delay discounting on the Monetary Choice Questionnaire was the strongest predictor of the level of cognitive distortions on the Gambling-Related Cognitions Scale. Data from Michalczuk et al. (2011).

**Figure 2.** Using positron emission tomography with the [11C]raclopride ligand, 9 males with problem gambling were compared against 9 healthy males. There were no group differences in dopamine receptor binding in the overall striatum, or striatal subdivisions, but within the group of gamblers, dopamine receptor binding was negatively correlated with self-report measures of mood related impulsivity (shown for Negative Urgency, on the UPPS-P). The central image shows the voxel-wise brainmap for the regression of Negative Urgency against dopamine receptor binding, showing (negative) correlations in right ventral putamen and left caudate. Data reprinted from Clark et al. (2012).
Figure 3. Effects of insula damage on gambling-related cognitive distortions. On the 2-reel slot machine task, a win was signalled if the two reels aligned, and if the right reel stopped one position from a match (as shown), this was considered a near-miss. Participants gave trial-by-trial ratings of their motivation to continue. The bar chart (top right) displays a change score (Δ) for this motivational ratings following near-misses compared to ‘full-misses’: the well-replicated increase in motivation following near-misses was abolished in the group with insula damage. In the roulette task (bottom left), participants made 90 consecutive red/blue predictions: the ‘gambler’s fallacy’ is seen as a decrease in the likelihood of choosing either colour as a function of the preceding run length of that colour. This effect was also absent in the group with damage to the insula region. Data reproduced from Clark et al. (2014).
Potential Clinical Applications of Responsible Gambling

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ABSTRACT

Responsible gambling tools are designed to help people gamble within their means. Empirical assessments have demonstrated their effectiveness in preventing problematic play among recreational gamblers. Herein, we contend that responsible gambling tools may also have clinical utility. In this light, we review some of the available responsible gambling tools and discuss why and under what conditions each may be appropriate in a clinical setting. In doing so, we point to areas that will benefit from empirical research with clinical populations. First, we argue that education-based tools may be used to undermine the client’s cognitive distortions and promote adherence to a pre-set limit. Second, we discuss monetary and time limit setting tools as an effective means to teach clients with moderation goals (in contrast to abstinence goals) how to minimize excessive play. Lastly, we suggest that personalized feedback (e.g., player account data or personalized gambling behaviour reports) provides a fairly unbiased assessment of the client’s gambling activities that can facilitate discussions about the future course of treatment. Due to the paucity of attention focused on the clinical applications of responsible gambling tools, our assertions are guarded, but nonetheless highlight the need for research in this domain.

Keywords: Responsible Gambling; Disordered Gambling; Treatment; Clinical; Goals; Limits; Education

A small, but significant number of people gamble excessively. To help stem this tide, tools have been developed to prevent excessive gambling. Although not an exhaustive list, most tools educate the gambler about the odds of winning, help the gambler set and adhere to a monetary limit on their gambling, or provide feedback about the gambler’s play. These tools are often referred to as responsible gambling tools because they purport to help the gambler play within their means and minimize the risks associated with gambling.

Importantly, empirical work has demonstrated the utility of responsible gambling tools to prevent problematic play within a gambling session. Despite the short-term success of these tools for the prevention of disordered gambling, a paucity of empirical attention has been focused on their use in a clinical setting to treat disordered gamblers. Herein, we discuss an array of existing responsible gambling tools and their potential application in a clinical setting. We also argue that some responsible gambling tools (e.g., limit setting tools) should...
only be used when both the client and their treatment provider establishes moderation (i.e., reduce problematic play) as the treatment goal. The purpose in doing so is to provide clinicians with an overview of some of the available responsible gambling tools, discuss their potential benefit for treatment of disordered gambling, and explicitly call for future research in this domain.

TREATMENT GOALS AMONG DISORDERED GAMBLERS

Disordered gamblers typically have one of two goals when entering treatment for their problematic gambling behaviour: abstinence (i.e., restraining oneself from gambling) or moderation (i.e., harm reduction as well as reducing excessive gambling). Traditionally, however, clinicians have focused on abstinence as the treatment goal for disordered gamblers, which can be at odds with clients who enter treatment with the aim of learning how to successfully moderate (as opposed to stop) their gambling. According to Hodgins, Leigh, Milne, and Gerrish, treatment is most successful when the clinician is aligned with the client’s goal for treatment. Thus, clinicians who advance an abstinence-related agenda on a client who wants to moderate their gambling behaviour tend to do so unsuccessfully, and vice versa. Indeed, clients in such a scenario often have high rates of relapse.

Within the abstinence framework, some responsible gambling tools may be appropriate to facilitate gambling cessation. Specifically, personalized feedback regarding player history from a particular gambling venue (e.g., a frequently visited casino) or jurisdiction in which a client resides (e.g., Ontario) may provide the client with an unbiased account of their problematic behaviour and guide the course of their treatment. Other responsible gambling tools, however, may be askew from an abstinence treatment goal. For example, gamblers who are geared toward cessation would not benefit from tools created to facilitate the setting and adherence to a monetary or time limit on play. It might even be argued that exposing abstinence-driven gamblers to responsible gambling tools that are focused on limit setting and adherence is inappropriate, counterproductive, and perhaps unethical. In such cases, self-exclusion (i.e., a self-imposed ban) may be a more appropriate avenue to adjust gambling behaviour.

Thus, whereas some responsible gambling tools are appropriate for an abstinence goal, other tools are best suited to facilitate a moderation-oriented treatment goal. That is, some responsible gambling tools may provide disordered gamblers with helpful information and strategies to modify (as opposed to halt) their behaviour and reduce the urge to gamble excessively. Importantly, moderation goals have been shown to be effective in reducing gambling-related harm. Specifically, Blaszczynski, McConaghy, and Frankova found that clients who chose to moderate their gambling showed improved psychological and social functioning and a reduced urge to gamble at a follow-up session two to nine years later. Moreover, psychological and social functioning among moderated gamblers was comparable to those who abstained from gambling. Thus, the psychological outcomes of treatment are not a function of the client’s treatment goal (i.e., moderation versus abstinence).

In the following section, we review the empirical research on an array of responsible gambling tools. However, it is important to note that the extant research on responsible gambling tools has been focused on the utility of such tools to moderate gambling within a community of active (typically, non-problem) gamblers. Herein, we discuss which responsible gambling tools may be best positioned to help reduce problematic gambling among clients with moderation goals, as well as which responsible gambling tools may facilitate gambling cessation among clients with abstinence goals. Specially, we discuss education-based initiatives as well as limit setting and personalized feedback tools that might have utility in a clinical setting. In doing so, we point to arenas that require future empirical study with clinical samples.

EDUCATING CLINICAL POPULATIONS ON RESPONSIBLE GAMBLING TECHNIQUES

The odds of winning are typically in favour of the gambling venue (i.e., “the house”). As a result, the gambler will experience monetary loss over the long haul. However, many gamblers have difficulty understanding that the odds of winning are not in their favour. Games of chance facilitate distorted cognitions about the odds of success including, among other things, inflated perceptions of skill in both games with an element of skill as well as games of pure chance. For example, some gamblers believe they have a personal luck that can be applied to games of chance to maximize their winnings. Unfortunately, such cognitive distortions
can lead to persistent gambling in the face of monetary loss, and ultimately lead to problematic play\textsuperscript{17,18}.

The aim of responsible gambling-oriented educational tools is to amend cognitive distortions among gamblers and replace them with realistic alternatives. Wohl and colleagues\textsuperscript{4}, for example, created a 9-minute animation-based responsible gambling educational video. The use of animation was purposeful – it allows for complex statistical information about the true odds of winning to be conveyed in a cognitively simple manner. The animation presented common misperceptions about how slot machines work and the odds of winning, proceeding to systematically undermine them using animated metaphors. Specifically, the animation described that the odds of winning are not influenced by a prior spin (i.e., the independence of outcomes) and that the odds of winning do not increase with each spin (i.e., the replacement feature). Rather, the odds of winning remain the same regardless of how many spins one plays. Lastly, the animation provided viewers with concrete strategies to help them to avoid gambling-related problems.

Results from an empirical assessment of the animation provided evidence for its utility as a responsible gambling tool\textsuperscript{5}. Gamblers who viewed the animation (relative to those who viewed a control video) demonstrated a reduction in gambling-related cognitive distortions, an effect that was sustained one month later. Importantly, watching the animation affected player behaviour. Gamblers who watched the animation set and adhered to a pre-set money limit more so than gamblers who did not watch the animation\textsuperscript{6,9}, however, this responsible gambling effect deteriorated over time. Thus, if used in a clinical setting, there may be a need for repeated exposure to the animation.

The results of the education-based animation provide support for its use among clients with moderation goals. Specifically, the animation has been shown to facilitate responsible gambling by increasing adherence to a pre-set monetary limit\textsuperscript{7}. Importantly, the information presented in the animation might also benefit clients with abstinence goals, because it was designed to undermine one of the foundations of problematic gambling (i.e., cognitive distortions). As such, there may be utility in using the animation to correct distorted cognitions among clients that may otherwise impede the treatment process. Indeed, anecdotal evidence from clinical settings (S. Chiasson, personal communication, April 22, 2015) suggests the animation has been successful in facilitating discussions about the information presented and reframing distorted gambling-related cognitions among clients. That being said, we argue that there is likely room for this animation, as well as other educational tools, to be tailored exclusively for clinical use.

**SETTING LIMITS ON GAMBLING ACTIVITIES**

Prior to gambling, most gamblers consider how much money they would be willing to lose\textsuperscript{19–20}. Unfortunately, many gamblers find that at the end of a gambling session, they have lost more money than anticipated\textsuperscript{20}. What is more, this overspending behaviour is especially prevalent among disordered gamblers\textsuperscript{21}. In order to gamble responsibly, there is consensus within the gambling field that gamblers should set and adhere to monetary limits during play\textsuperscript{22,23}.

Empirical assessment has lent support to the supposition that monetary limit setting and adherence facilitates responsible gambling. Auer and Griffiths\textsuperscript{22}, for example, found that online slot machine players who set a monetary limit on their play (compared to those who did not) significantly decreased their gambling expenditures. In another assessment, Stewart and Wohl\textsuperscript{1} provided gamblers with the opportunity to set a monetary limit via a responsible gambling tool (a pop-up message that appeared on the slot machine prior to play). Importantly, some gamblers also received a message (via pop-up message) that reminded them of their pre-set limit once reached. In line with their predictions, participants who received the reminder were more likely to adhere to their limit than participants who did not receive the reminder. Thus, it may be important to teach clients who have moderation goals (but not abstinence goals) to seek out gambling venues that have responsible gambling tools for monetary limits. Such tools, however, are not currently ubiquitous.

It should be noted that setting a monetary limit is not the only limit setting tool available to gamblers. Indeed, gamblers may also set and adhere to the time they wish to spend engaging in gambling activities. That said, gamblers tend not to set a time limit on their play when unprompted\textsuperscript{20,22–24}. However, Kim and colleagues\textsuperscript{2} showed that when slot machine gamblers are given the opportunity to set a time limit via a pop-up message, they are more apt to do so. Moreover, gamblers who set a time limit gambled for less time than those who did not set a time limit. Based on the existing literature, Polatschek, Wadden and Gwynn\textsuperscript{25} suggested that a time limit may be the most effective means to modify excessive play. With that said, Auer and Griffiths\textsuperscript{22} noted that a voluntary time limit was more effective for poker players than players who engage in other forms of gambling (e.g.,
slot machine gambling). They argued that a time limit is particularly helpful for poker players because of the significant amount of time that is often invested in this form of gambling. In all other forms of gambling, however, they concluded that a monetary limit was more effective at modifying behaviour among problem gamblers. Regardless, clients who want to modify their gambling behaviour (as opposed to abstain) are likely to be served well by education on the benefits of both monetary and time limit setting and adherence.

Where responsible gambling tools are not available, clients could be taught methods to set a monetary limit and then adhere to that limit. For instance, gamblers might be encouraged to use a reminder application on their smart phone (if they own one). The application could be set to periodically remind the client of their monetary limit with a tone or text message. Using an application to remind a client of a pre-set limit, however, might be more amenable to a pre-set time limit of play. This is because applications are not able to track wins and losses, unless the client enters such information after every wager—a highly unlikely scenario as it would likely undermine any enjoyment the gambler gets from gambling.

PERSONALIZED FEEDBACK TO FACILITATE RESPONSIBLE GAMBLING

Improvements to information technology have propelled the development of responsible gambling initiatives, particularly in regards to online gambling. Indeed, the gambling industry has increasingly incorporated account-based technologies (e.g., Bwin and PlayScan) into both land-based and online gambling venues. These technologies allow corporations to track players to assess both individual and overall patterns of gambling. The possession of such player account data presents an opportunity to provide disordered gamblers with personalized, unbiased feedback about their play in hopes that such information will modify their gambling behaviour. Importantly, player attitudes toward receiving activity reports (i.e., behavioural and financial summaries) have been generally positive.

The utility of personalized feedback for responsible gambling has received empirical support. For example, Griffiths, Wood, and Parke showed that personalized information regarding the riskiness of one’s gambling had positive behavioural consequences. More recently, Wood and Wohl found that players who received feedback on the riskiness of their gambling behaviour demonstrated a significant reduction in amounts deposited and amounts wagered in the following week compared to players who chose not to utilize this responsible gambling feature. Taken together, we contend that gamblers who wish to moderate their gambling may find personalized feedback helpful in achieving these goals. This is because personalized feedback provides immediate information about one’s gambling behaviour. With that said, a historical record of past play might also provide the clinician and client with useful information when the goal of treatment is abstinence from gambling. With the client’s player account history, clinicians may be able to detect potential risk factors based on the client’s previous patterns of gambling and assist the client in avoiding problematic play.

Moreover, personalized feedback regarding how the gambler compares to other gamblers in the population (i.e., normative feedback) has been shown to motivate behavioural change among disordered gamblers. In a brief intervention, Cunningham and colleagues provided disordered gamblers with normative feedback regarding their gambling frequency, gambling-related cognitions, gambling expenditures, and Canadian Problem Gambling Index score (CPGI; i.e., problem gambling severity). Moreover, this information was presented with a comparison of how the gambler’s scores compared with other gamblers from the population. Gamblers who received such feedback reduced their gambling expenditures in the following months. Importantly, gamblers rated that knowledge of their CPGI score, when presented in comparison to other gamblers, was the most useful feature. Indeed, many gamblers hold the belief that others gamble as much or more than they do. Thus, clinicians may find it beneficial to incorporate normative feedback about the client’s gambling into the treatment process. Such information may facilitate discussions about their excessive play.

Lending some support for the use of personalized feedback in clinical settings (for those with either moderation or abstinence goals) is research on the Canadian Problem Gambling Index Profiler (CPGI-P). The CPGI-P is a computerized assessment tool that provides detailed information about the client’s gambling attitudes and behaviours (including severity of disordered gambling) to assist clinicians in their treatment of gamblers. This
feedback is presented visually and simplistically to facilitate discussion between clinician and client. In an empirical assessment of the CPGI-P in a clinical setting, Young and Wohl found that clients viewed the CPGI-P feedback positively – the information provided was perceived to be easy to understand. Importantly, clients also reported that the feedback helped them to engage with the clinician and motivated them to initiate behavioural change.

In a similar vein, Gainsbury argued that player account data might be useful for clinicians during the treatment process. Of course, when player account data is collected by the gambling industry, this information would need to be released to gamblers if they are to benefit from it. Thankfully, there is movement by the gambling industry to make this information available to the gambler on request or via RG tools on online gambling sites. Additionally, players must be willing to provide their player data to the clinicians. Without the client’s consent, the clinician is unable to incorporate the client’s player history into treatment. Clients’ willingness to provide such data, however, may introduce biases to personalized feedback – gamblers may hold player accounts for multiple gambling venues and only choose to share a single account with their clinicians. Tools like the CPGI-P, however, can be administered during treatment, and do not require involvement with the gambling industry.

We contend that the unbiased information about the client’s gambling behaviour provided by a personalized feedback tool provides clinicians with a greater understanding of the client’s gambling history, progress toward change, as well as setbacks (should they occur).

Clinicians could also use this information as a means to initiate discussion about responsible gambling (i.e., when a moderation goal is set) or the need to consider abstinence. Indeed, clients may be more willing to attend to personalized feedback due to its self-relevant nature. Thus, personalized feedback about the client’s gambling behaviour may prove invaluable for the treatment of disordered gambling. However, additional research is needed in this domain.

**CONCLUSION**

In the current paper, we put forth the proposition that responsible gambling tools may be useful for the treatment of disordered gambling. However, we argued that the utility of such tools differ depending on the gambler’s goal for treatment (i.e., moderation or abstinence). Educational animations may be helpful in terms of reducing disordered gamblers’ inflated beliefs about their odds of winning. Pop-up messages may facilitate the setting of both a monetary and time limit, and encourage adherence to any pre-set limit. Furthermore, unbiased feedback about a gambler’s play (e.g., from player account data) may help facilitate discourse during treatment as well as help determine a future course of treatment. With that said, empirical assessments about the usefulness of responsible gambling tools in the clinical setting are lacking. Any use of responsible gambling tools should be based on sound scientific research prior to implementation. Thus, we call on researchers to examine the utility of responsible gambling tools in the clinical setting – we feel the potential yield is worth the effort.

**REFERENCES**


The Influence of Smoke-free Policies on Gambling Revenues and Intentions to Gamble: A Review of the Literature

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ABSTRACT

Objectives. A large body of research suggests that tobacco use and gambling are highly co-morbid addictive behaviours. Since the early-2000s, many jurisdictions in North America, Europe, and Australia have introduced smoke-free legislation for indoor public places in an effort to protect citizens from exposure to second-hand smoke. While this may be the primary purpose of smoking bans, an indirect effect of smoking restrictions may be a reduction in other addictive behaviours such as gambling. The goal of this paper is to provide a review of the empirical literature examining the effects of smoking bans on gambling revenues and intentions to gamble. Methods. The publications included in the review were gathered from several electronic databases and government sources. Studies which examined the effects of smoke-free policies on gambling-related revenues or intentions to gamble as primary outcomes of interest were included. Results. Overall, the current research evidence is mixed. Some studies suggest that smoke-free policies have a negligible impact on gambling revenues; whereas others find a substantial decrease. Studies employing regression analyses which incorporate other economic variables and competitive forces more consistently find that smoking bans decrease gaming revenues. Studies with gambling intentions as the primary outcome variable indicate that non-smokers are more responsive than smokers to the introduction of smoke-free regulations. Conclusions. The extent to which smoke-free legislation influences gambling remains unclear. More research is needed, especially studies incorporating longitudinal designs, to better understand how individual gamblers who smoke are affected by these policies.

Key words: Smoke-free, Smoking Ban, Casinos, Gambling, Revenues

Objectifs. Un grand nombre de recherche suggère que l’usage du tabac et les jeux de hasard et d’argent sont des comportements à haut risque de dépendance. Depuis le début des années 2000, plusieurs juridictions nord-américaines, européennes et australiennes ont mis en application une loi anti-tabac dans les lieux publics fermés dans le but de protéger les citoyens d’une exposition à la fumée secondaire. Bien que ce soit fort probablement la principale raison pour appliquer l’interdiction de fumer, un effet indirect pourrait être une diminution de la fréquence d’autres comportements à risque de dépendance comme les jeux de hasard et d’argent. Le but de cet article est de passer en revue les écrits empiriques ayant examiné les effets d’une interdiction de fumer sur les revenus obtenus par les jeux de hasard et d’argent et les intentions d’y jouer. Méthodes. Les publications inclues dans la recension des écrits ont été tirées de nombreuses bases de données électroniques et de sources gouvernementales. Les études inclues ont examiné les revenus liés au jeu ou les intentions de jouer comme principaux résultats d’intérêts et les effets des politiques anti-tabac sur ces résultats. Résultats. Dans l’ensemble, les données disponibles sont partagées. Certaines études suggèrent que les politiques anti-tabac ont un effet négligeable sur les revenus obtenus par les jeux de hasard et d’argent alors que d’autres rapportent une diminution considérable. Les études ayant utilisé des analyses de régression qui ont contrôlé pour des facteurs économiques et des forces concurrentielles rapportent davantage que les interdictions de fumer diminuent les revenus. Les études avec comme principal résultat d’intérêt les intentions de jouer indiquent que les non-fumeurs sont plus sensibles que les fumeurs à l’introduction d’une loi anti-tabac. Conclusions : À quel point les lois anti-tabac influencent la pratique des jeux de hasard et d’argent demeure incertain. D’autres travaux de recherche sont requis, particulièrement des études longitudinales, pour mieux comprendre comment les fumeurs et fumeuses qui jouent à des jeux de hasard et d’argent sont affectés par ces lois.
INTRODUCTION

In 2004, the Republic of Ireland made history by becoming the first nation to introduce comprehensive legislation to ban smoking in all workplaces including bars and restaurants. Soon after, other European countries followed suit by enacting varying versions of smoke-free legislation for indoor public places. However, both North America and Australia have an even longer history of introducing smoke-free policies at the municipal and provincial/state levels, in some cases dating back to the 1980s. The primary goal of smoking bans is to protect the public from exposure to second-hand smoke (SHS), a serious health hazard which is known to increase the risk of developing numerous conditions such as ischaemic heart disease, respiratory illnesses, as well as lung cancer, and is responsible for approximately 1% of total mortality. The effectiveness of smoke-free legislation for reducing SHS-related exposure and harms was the subject of a recent Cochrane review. The aggregate research findings from this review supports the contention that smoking bans significantly reduced rates of self-reported perceptions of SHS exposure, biomarker validated smoke exposure, as well as several health outcomes (i.e., respiratory symptoms, sensory symptoms, and acute coronary syndrome) among non-smokers.

While smoke-free legislation is primarily directed at limiting the risk for SHS exposure for non-smokers; a secondary benefit of smoking bans may be a reduction in other addictive behaviours among smokers themselves. For example, alcohol use and smoking are highly associated addictive behaviours. A recent series of studies found that smoke-free legislation was associated with decreased alcohol consumption in pubs among heavy drinkers; a reduction in drinking frequency among individuals who heavily consume both alcohol and tobacco; and increased remission of alcohol use disorders (AUDs). It is conceivable that smoke-free legislation may also impact other addictive behaviours that are commonly paired with smoking such as gambling. The purpose of this paper is to provide a review of the literature on the impact of smoke-free legislation on the smoking-gambling relationship. Studies focused on gambling-related outcomes following the implementation of a smoking ban are compiled and the implications of these findings on tobacco and gambling policy as well as potential clinical implications are discussed.

METHODS

The included studies were assembled using keyword searches from electronic databases (i.e., PubMed; Psyclnfo; Web of Science; Proquest; and Scopus), Internet search engines (i.e., Google Scholar), government websites, and from the reference lists of published articles. Key words used to identify relevant articles and government reports included: ‘tobacco AND gambling’; ‘smoking AND gambling’; ‘cigarettes AND gambling’; ‘smoking bans AND gambling’; ‘smoke-free AND gambling’; ‘smoke-free AND casino’; ‘smoke-free AND casino’; and ‘comorbidity AND gambling’. Searches were not limited to specific timeframes of publication. Papers which examined the impact of smoking bans on any gambling-related outcomes were considered for inclusion in this review; however, the available studies have predominantly focused on economic outcomes (e.g., casino revenues, tax revenues) or gambling intentions (e.g., hypothetical likelihood of visiting a casino following a ban). This review begins by first providing a brief description of the empirical evidence linking smoking with gambling. An overview of epidemiological studies of co-morbid smoking and gambling, research on tobacco use in clinical samples of gamblers, and laboratory experiments investigating the acute effects of nicotine on gambling are discussed in turn. This paper uses the term disordered gambler (DG) to refer to individuals who gamble excessively or display symptoms of what was previously classified as ‘problem’ or ‘pathological’ gambling. Next, research addressing the relationship between smoking and gambling is presented according to three broad themes: (1) epidemiological studies linking smoking and gambling; (2) the influence of smoking on gambling at the level of the individual; and (3) the connection between smoking and gambling at the population level. The review will conclude with a discussion of aspects of the relationship between smoke-free legislation and gambling which have yet to be addressed as well as the potential implications of this line of work.

EPIDEMIOLOGY OF TOBACCO SMOKING AND GAMBLING

A sizeable body of evidence indicates that tobacco smoking and gambling are tightly linked. Epidemiological
investigations have revealed rates of tobacco dependence among DGs ranging from 41% in the Canadian province of Ontario to over 60% in a National Survey from the United States\textsuperscript{11}. Furthermore, a recent meta-analysis of studies from numerous jurisdictions found that tobacco dependence was the most pervasive disorder (60.1%) among DGs followed closely by other substance use disorders (SUDs) combined (57.5%) \textsuperscript{11}. Studies of gamblers seeking treatment have found that DGs who smoke have higher gambling severity scores, are more likely to play non-strategic gambling such as electronic gaming machines (EGMs), spend more time and money gambling, and report higher rates of other substance use problems compared to non-smoking DGs\textsuperscript{14, 15, 16, 17}. Community-recruited regular gamblers who smoke from Newfoundland and Labrador were also found to be more likely to use alcohol/other drugs while gambling, endorse use of EGMs, spend more money gambling, and report higher gambling severity scores than gamblers who don't smoke\textsuperscript{18}. Interestingly, despite the high degree of co-morbidity between DG and tobacco dependence, observational studies of casino patron smoking behaviour from several U.S. states (i.e., Delaware, Nevada, Pennsylvania) suggest that smoking rates in casinos mirror those found in the general population, with only one exception in a study from California\textsuperscript{19}. The aggregate of this research indicates that gambling and smoking are closely linked and it is feasible that an interruption in one behaviour could result in a decrease in the other. In spite of high rates of co-occurrence, precise causal relationships between smoking and gambling have yet to be established. It is feasible that one behaviour exacerbates the other (or vice versa) or that common underlying mechanisms (e.g., genetics, personality, social factors) influence the expression of both behaviours. To date, most experimental research on this topic has focused on the causative role that acute and chronic smoking may have on gambling behaviour. Next, the literature on individual level effects of smoking on gambling is reviewed followed by an examination of the population level influence of smoking behaviour and tobacco policy on gambling.

**INFLUENCE OF TOBACCO SMOKING ON GAMBLING AT THE POPULATION LEVEL**

The previously described experimental studies suggest that smoking may have a direct influence on individual gambling behaviour. Yet, it is also probable that smoking may impact gambling at the population level. The proliferation of smoke-free legislation provides a unique opportunity for a more naturalistic examination of tobacco’s influence on other behaviour including gambling. Recent research from the tobacco control literature, for instance, suggests that smoking bans can alter attitudes toward smoking itself by producing feelings of social exclusion, heightening awareness of smoking norms, and increasing self-awareness\textsuperscript{26}. The remainder of this review focuses on the available research examining the extent to which smoke-free legislation may also alter gambling outcomes. First, studies on smoking bans and charitable gaming revenues are discussed, followed by those investigating overall casino revenues, gambling venue substitution, and intentions to gamble. Each of

**INFLUENCE OF TOBACCO SMOKING ON GAMBLING AT THE INDIVIDUAL LEVEL**

Most research on tobacco use and gambling has been correlational in nature; however, recent laboratory experiments have attempted to investigate the causal role of acute nicotine administration on gambling at the individual level. This experimental work is based on findings from the tobacco literature which suggest that nicotine may directly enhance the incentive value of other rewards unrelated to smoking\textsuperscript{20, 21}; especially those that are sensory in nature\textsuperscript{22}. In two experiments, the effects of nicotine replacement therapy (NRT) on video lottery terminal (VLT) betting and gambling craving were examined. In both cases, it was found that nicotine inhalers did not enhance subsequent laboratory gambling on a VLT\textsuperscript{23} nor did nicotine lozenges augment gambling craving in a sample of moderate risk/DG gamblers following exposure to gambling cues\textsuperscript{24}. One potential explanation for these negative findings is the slower absorption and lower acute blood nicotine levels associated with NRT when compared to tobacco. In a follow-up study, Barrett, Collins, and Stewart\textsuperscript{25} examined the combined effects of alcohol and nicotine delivered via tobacco on VLT gambling. While alcohol was found to enhance gambling craving, it did not influence VLT betting patterns. However, nicotine-containing tobacco did not impact subjective gambling craving but did increase average wagers on the VLT. The findings from this experiment indicates a potential causal role for tobacco, but not nicotine per se, on acute gambling outcomes. Specifically, both the pharmacological effects of nicotine and other tobacco constituents, along with associative learning processes from the pairing of smoking with gambling, may enhance the reinforcement of rewards associated with gambling.
the studies included in these sections of the paper are summarized in Table 1.

SMOKING BANS AND CHARITABLE GAMING

Since the introduction of several state-wide smoking bans in the early 2000’s, a growing number of studies have examined their economic impact on gambling. One of the first investigations focused on the influence of municipal smoke-free legislation on bingo hall and other charitable gaming profits in Massachusetts. The data came from the Massachusetts State Lottery Commission and included gross receipts and net profits/losses from over 200 municipalities that permitted charitable gaming between 1985 and 2001. The researchers used a time-series analysis which controlled for other variables including: size of the community, year of the ban, lagged profits, and length of time the smoking ban had been in effect. Overall, a substantial and consistent decrease in charitable gaming profits over time was identified; however, smoking bans were not found to exacerbate this decline. In a similar study from Kentucky, Pyles and Hahn compared gross and net revenues over the period of 2000 to 2007 between counties which had implemented smoke-free legislation versus those that did not. In line with the findings of Glantz and Wilson-Loots, smoking bans did not negatively influence charitable gaming revenues after controlling for other economic factors. In both studies, the authors conclude that there is no economic argument against implementing smoke-free laws in gaming venues.

Conversely, a study conducted by the Minnesota Gambling Control Board did find a significant impact of smoke-free legislation on charitable gaming. Consistent with the previously described studies, charitable gambling revenues had been in steady decline with a 2.5% reduction per year in the five years prior to the introduction of the smoking ban in 2007. However, the analysis also found a sizable further decrease in quarterly revenues (compared to the year prior) immediately following the smoking ban; a decline of between 7.5% and 8% in state-wide gambling receipts. Presently, the role of smoking bans on charitable gaming remains inconclusive.

SMOKING BANS AND CASINO REVENUES

In being the first state to introduce comprehensive smoke-free legislation in 2002, many initial investigations of casino revenues were focused on Delaware. Mandel, Alamar and Glantz conducted the first study of smoking bans and state-wide gambling revenues. Using data from three casinos collected prior to and post smoking ban, the researchers conducted regression analyses on two outcome measures: total revenues and average revenue per machine. Controlling for other economic variables, time, and seasonality, no significant effects of smoking bans on revenues were found. In a published erratum, the authors adjusted for errors in their analyses but still did not find a significant influence of the smoking ban on gambling revenues. Following this investigation, Pakko conducted a series of studies with the same data, but came to a different conclusion. Specifically, using an alternative approach and controlling for heteroskedasticity and seasonality, he found that the smoking ban was directly responsible for up to a 20% reduction in revenues and a 10% decline in casino admissions. Alamar and Glantz; however, disputed the specifications of the model employed by Pakko and the assertion that the smoking ban negatively impacted revenues.

Nonetheless, further support for Pakko’s conclusions was provided in an independent follow-up study. Using data from the same Delaware casinos, Thalheimer and Ali considered the effects of the smoking ban on slot machine handle (i.e., the total credit/dollar amount wagered on slot machines), a more direct measure of casino wagering demand than net revenues. Accounting for other economic variables and competitive forces, their regression analysis revealed a 15.6% decrease in slot handle that was attributable to the smoking ban. Subsequent examinations of the economic impacts of smoking bans have also been conducted in other states. For instance, two studies describe the effects of smoke-free legislation in the state of Illinois, finding decreases in gambling revenue as high as 30%. Lastly, Macy and Hernandez compared the economic impact of a smoking ban in a single off-track betting facility in Indiana with two other facilities that were not subject to the ban. After controlling for the rate of unemployment, it was found that per capita money wagered decreased for all three venues over time; however, contrary to previous research the smoking ban did not significantly contribute to this decline.

Research from Australia has also examined the influence of smoking bans on gambling. Lal and Siahpush compared gambling revenues in the Australian state of Victoria following smoke-free legislation with South...
Australia where smoking in gaming venues was permitted. Using time-series modelling, total gaming expenditures and the ratio of monthly electronic gaming expenditures were compared between the two states over a 7 year period (1998-2005) which spanned the implementation of Victoria’s smoking ban in 2002. It was found that the smoking ban resulted in a significant decrease in that state’s ratio (-0.73), equating to a 14% decrease in monthly gambling expenditures. The authors suggest that this decrease was both abrupt and permanent. A subsequent report by Hirschberg and Lye further analyzed economic data from gaming venues in Victoria. Specifically, they isolated the regional impact of the ban on gaming venues located near the border of New South Wales (where public smoking was still permitted) and compared it to venues further from the border. Reductions in gaming revenue were found for the entire state; however, venues near New South Wales experienced a further 4.4% decrease. There was also a 1.2% reduction in state taxes due to the smoking ban in the year following its implementation. Overall, the aggregate results from this research appear to be mixed with some studies finding a negative impact of smoking bans on gambling revenues whereas others do not.

SMOKING BANS AND GAMBLING VENUE SUBSTITUTION

While most studies of smoking bans and gambling have focused on revenues as the outcome of interest, some have extended these parameters by measuring venue substitution with casinos that permit smoking. Quintana explored the extent to which casinos that allow smoking in Atlantic City, New Jersey served as substitutes for those in neighbouring Delaware following the introduction of a smoking ban. Using data from both states, Quintana established that when casinos were introduced in Delaware in 1996, it resulted in a 9.3% decrease in gaming revenues for Atlantic City; suggesting these new casinos served as substitutes for those in Atlantic City. Next, the analysis examined whether a similar substitution effect existed following Delaware’s smoking ban in 2002; that is, whether revenues shifted from Delaware back to Atlantic City. After controlling for economic conditions, it was found that Atlantic City’s revenues increased by 6.3% following the smoke-free ordinance in Delaware. These findings suggest that at least some gamblers who smoke from Delaware may have chosen to gamble in Atlantic City where smoking was still allowed.

Navin, Sullivan, and Richards recently examined the impact of the smoking ban in Illinois on gambling revenues and venue substitution. They compared two casinos in Illinois with three other casinos situated across the border in Missouri, a state which did not have similar smoke-free legislation. The five casinos were located within close proximity to each other (i.e., a 30-mile diameter), increasing the ease with which they could serve as substitutes for one another. Gaming revenues between these casinos in the two states were compared for the first 18 months following the Illinois smoking ban. The casinos on both sides of the border experienced decreased combined revenues, but the percentage drop was significantly greater for the Illinois (slot handle: -24%, table drop: -16%) compared to the Missouri casinos (slot handle: -11%, table drop: -13%). However, other potential confounding factors (i.e., the economic recession, and the opening of new casino in Missouri) were not accounted for in this analysis. A more nuanced regression analysis controlling for these extraneous variables indicated that the smoking ban was primarily responsible for a corresponding 26% decrease in slot handle and a 22% reduction in table drop. The authors conclude that the smoking ban significantly impacted gaming revenues and most likely facilitated a migration of gamblers from non-smoking casinos in Illinois to gaming venues in Missouri.

Lastly, another recent study investigated the impact of the Illinois smoking ban on casino admissions. State casinos admissions were compared to those in the bordering states of Indiana, Iowa and Missouri, which did not have similar smoke-free legislation. Using a regression model which accounted for other factors including time, economic conditions, and distance to bordering state casinos, it was found that casino admissions in Illinois were not adversely affected by the legislation. Moreover, casino admissions in the other states did not increase, suggesting that out-of-state casinos did not serve as substitutes for those in Illinois. The researchers conclude that although revenues from casino gaming in Illinois did decrease following the ban, the primary cause was not a reduction in casino admissions.

SMOKING BANS AND INTENTIONS TO GAMBLE

To date, most investigations of smoking bans have focused on broader economic impacts; however, three recent studies examined individual gambler intentions as outcomes of interest. Barrow and Burges surveyed 401 respondents in Illinois who reported gambling in a casino at least once in the previous 12 months. Respondents were asked: “All things being equal in terms of size, gaming options and distance from your home, if smoking were prohibited on the gaming floor, would you be more likely or less likely to visit a casino where smoking
is prohibited, or does it not matter”? It was found that 45% of respondents stated they would be more likely to visit a non-smoking casino, 31% said it didn’t matter, and only 24% were less likely to visit. Interestingly, among respondents who smoke, 36% reported they prefer a non-smoking environment or that it doesn’t matter. Respondents were also asked if they had reduced their number of casino trips due to economic reasons (with a list of 8 possible reasons provided). Seventy-five percent stated gasoline (40%) and the cost of living (35%) as reasons for not visiting casinos. Lastly, the researchers investigated whether other within-state gaming options were affecting casino visitation, specifically video poker in clubs and bars. Of those surveyed, 14% reported playing video poker in bar setting as a substitute for casino gambling. The authors speculate that the combination of economic factors and the introduction of video poker were significant contributors to the overall decline in casino revenues after the introduction of the ban.

Two recent studies examined attitudes toward smoke-free legislation and gambling intentions among patrons of Native American tribal casinos. The first used data from the 2008 California Tobacco Survey, a state-wide cross-sectional survey of tobacco use with responses from over 10,000 individuals44. Among those who visited a tribal casino in the past 12 months (n = 3,361), 17.6% reported being current smokers. When asked about efforts to avoid smoke exposure while gambling, significantly more never smokers (71.8%) and former smokers (64.5%) than current smokers (20.4%) reported moving around the casino to evade SHS. Respondents were also asked if a smoking ban was introduced, would their likelihood of visiting casinos increase, decrease, or remain the same. Among casino patrons, a significantly greater number of never smokers (42.1%) and former smokers (35.8%) than current smokers (7.0%) stated they would be more willing to visit. The opposite pattern was also found with significantly more current smokers (22.5%) than never smokers (2.6%) or former smokers (2.0%) saying they would be less likely to visit if a smoking ban was implemented.

Finally, a second study surveyed 957 members of a Native American casino in Wisconsin regarding their preferences for a smoke-free gaming environment45. When asked if they would be more or less likely to visit if smoking was prohibited, over half (54%) stated they would visit more, 18% would visit less, and 28% would be indifferent. Those who reported being more likely to visit were significantly older, tended to be white, were middle to high income earners, and were more likely to visit the casino for multiple reasons (e.g., eat at the restaurant, entertainment, and gambling). However, the majority (77%) of respondents were non-smokers, and a comparison of smokers vs. non-smokers on intentions to visit if a smoking ban was implemented was not provided. Overall, the results of these studies suggest that non-smokers would be especially amenable to the introduction of smoke-free legislation in tribal casinos, and an increase in non-smokers may ultimately offset reductions in attendance by current smokers.

CONCLUSION

This paper was designed to provide a broad overview of the studies that have examined the effects of smoking bans on gambling revenues and intentions to gamble. The aggregate of the studies on gambling revenues is decidedly mixed with some investigations finding no effects of smoking bans while others suggest a substantial and immediate impact. Moreover, discrepant findings were seen across different types of gambling venues (e.g., charitable gambling, casino gambling) as well as various gambling outcomes (e.g., overall revenue, state taxes, slot handle, table drop, casino admissions). However, investigations that have incorporated more complex regression models, accounting for multiple extraneous variables, provide strong evidence for the negative effects of smoke-free legislation on gaming revenues35, 37, 39. Recent studies have also extended this literature by surveying gamblers on their intentions to gamble if a smoking ban was introduced. Perhaps unsurprisingly, non-smokers appear to be more receptive to smoke-free legislation. For instance, they reported frequently moving around casinos to avoid secondhand smoke44 and stated they would be more likely to visit a smoke-free casino44, 45. While this type of survey research provides insight into attitudes toward smoke-free legislation, the extent to which these intentions translates into real-world gambling behaviour after implementation of a smoking ban is unknown.

There are a number of plausible explanations for inconsistencies in the findings of this line of research. First, in many cases the outcome variables of interest often differ across studies. For example, some of the economic variables that have been examined include: total casino revenue, average revenue per gaming machine, total amount wagered on slots, statewide gaming expenditures, state
revenue from gaming-related taxation etc. Relatedly, researchers have also used varying methodological approaches in their analyses. For instance, the studies from Delaware in particular highlight the extent to which results can fluctuate as a function of the statistical approach used and the variables chosen for inclusion. Lastly, numerous municipalities, states/provinces, and countries have been examined. It is feasible that results from one area may not generalize to others given the degree of variability in smoking rates as well as differing norms surrounding smoking and gambling between jurisdictions.

Taking an account of the studies cited in this review, it’s clear there remain several important gaps in the literature. For instance, virtually no research has focused on how smoking bans affect gamblers at the level of the individual. Although reduced gaming revenues may indicate that fewer smokers are gambling, the extent to which actual behaviour is altered has yet to be examined. For example, do smokers continue to gambling as frequently, as long, or bet as much per session after a smoking ban? It would also be interesting to know whether gamblers who smoke adapt to smoking bans. For instance, would they simply periodically take smoking breaks outside? If so, would this provide an opportunity for further reflection on their gambling as others have suggested? Finally, it is not known whether smoke-free legislation would disproportionally impact DGs. Previous research suggests that the behaviour of dependent smokers as well as drinkers is influenced by smoking bans, it is conceivable that rates of DG could also be impacted. More longitudinal research is needed to clarify the nature of the association between smoking and gambling. For instance, comparing gambling behaviour pre- versus post-smoking ban could help to elucidate the directionality of this relationship. Furthermore, cross-lagged longitudinal designs spanning several timepoints may distinguish possible reciprocal relations between smoking and gambling as well as the role of likely moderating variables (e.g., personality, other substance use, mental health, familial/social relationships etc.).

Finally, although smoke-free policies likely do not have direct clinical implications for the treatment of DG, research on smoking bans may shed light on potential targets for intervention. For example, recent evidence from the National Epidemiological Survey on Alcohol and Related Conditions (NESARC) in the United States indicates that smoking bans have significantly influenced transitions in AUD status at the population level. Similar research applied to smoking and gambling context could help to not only identify temporal relations between these co-morbid addictions, but also risk factors and protective influences which could in turn inform clinical practice. Ultimately, only through integrating more gambling-focused outcomes into a wider array of research designs can the impact of smoke-free policies on gambling at the individual and population levels be effectively understood.

REFERENCES

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