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Motivation-Matched Approach to the Treatment of Problem Gambling: A Case Series Pilot Study

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Abstract

The aim of the present case series was to provide a preliminary assessment of the utility of a motivation-matched treatment for problem gamblers. On the basis of their primary underlying motivations for gambling, 6 problem gamblers received either action-motivated (n = 4) or escape-motivated (n = 2) treatment. Drawing upon a cognitive-behavioural framework, this 6-session motivation-matched treatment was designed to address gamblers' maladaptive motivations for gambling (i.e., the need or desire for "escape" or "action"), as well as the effects of conditioning and maladaptive thinking patterns unique to each gambling motive subtype. Assessments were conducted at pre-treatment, post-treatment, and 3- and 6-month follow-up. Primary outcome measures included gambling behaviour (i.e., gambling frequency, time, and money spent gambling), severity of gambling problems, and gambling-related impairment or disability; secondary outcome measures included gambling-related craving, gambling abstinence self-efficacy, positively and negatively reinforcing gambling situations, and gambling outcome expectancies. Overall, participants showed pre- to post-treatment improvements on the majority of these measures, with relatively less immediate post-treatment treatment gains observed on measures that assessed positively and negatively reinforcing gambling situations and gambling-related impairment or disability. However, treatment gains at the 3- and 6-month follow-up were shown for most participants on these latter measures as well. Findings suggest promise for this novel treatment approach. The next step in this line of research is to conduct a randomized, controlled trial to compare the efficacy of this motivation-matched treatment for disordered gambling with treatment as usual.

Keywords: Problem gambling, motivation, treatment, pilot study, reliable change index, motivation-matched treatment, case series

Résumé

L'objectif de la présente étude de série de cas était d'effectuer une évaluation préliminaire de l'utilité d'une thérapie tenant compte des motivations chez les personnes ayant un problème de jeu. En fonction de leurs principales motivations sous-jacentes à l'égard du jeu, six joueurs excessifs ont reçu un traitement axé sur le jeu motivé par l'action (n = 4) ou motivé par la fuite (n = 2). S'inspirant du cadre cognitivo-comportemental, les six séances de thérapie tenant compte de la motivation ont été conçues dans le but de traiter les motivations au jeu relevant d'une mésadaptation (soit le besoin ou le désir de « fuite » ou d'« action ») ainsi que défaire le conditionnement et les schèmes de pensée mésadaptés propres à chaque sous-type de motivation au jeu. Des évaluations ont été réalisées avant et après la thérapie, et par la suite un suivi a été effectué trois et six mois plus tard. Les mesures des principaux résultats touchaient les comportements associés au jeu (la fréquence des séances de jeu, leur durée et le montant d'argent dépensé), la gravité des problèmes de jeu et les pertes ou incapacités liées au jeu, alors que les mesures des résultats secondaires concernaient l'envie de jouer, l'auto-efficacité de l'abstinence à l'égard du jeu, le renforcement positif et négatif des situations de jeu et les attentes quant à l'issue des jeux de hasard. De manière générale, la plupart de ces mesures ont donné lieu chez les participants à une amélioration entre les évaluations précédant et suivant la thérapie, quoique que les gains observés dans l'évaluation faisant immédiatement suite à la thérapie aient été relativement moins importants dans le cas des mesures portant sur le renforcement positif et négatif des situations de jeu et sur les pertes ou les incapacités liées au jeu. Toutefois, des améliorations concernant ces mesures ont été observées chez la plupart des participants lors des suivis effectués trois mois et six mois après la thérapie. Les constatations de l'étude laissent supposer que cette nouvelle approche thérapeutique est prometteuse. La prochaine étape dans ce domaine de recherche sera de mener un essai clinique randomisé afin de comparer l'efficacité d'une thérapie contre le jeu excessif tenant compte des motivations par rapport à l'approche thérapeutique habituelle.

Introduction

Despite advances in research and treatment, problem gambling (PG) is a significant public health concern. Further, research examining theoretical models and evidence-based treatments for PG is still in its infancy compared with research on other addictive behaviours (Ledgerwood & Petry, 2005). One potential reason for this lack of research is that problem gamblers are often viewed as a homogeneous population. Currently, the standard intervention for PG is cognitive behaviour therapy (CBT); however, the usual "one-size-fits-all" approach is only moderately

effective (see Ledgerwood & Petry, 2005). With the emerging recognition that problem gamblers are a heterogeneous population who may respond well to treatments that target this heterogeneity (e.g., Blaszczynski & Nower, 2002), it has been recommended that interventions be geared towards specific subtypes of gamblers (Suomi, Dowling, & Jackson, 2014).

Within addiction research, previous studies highlight the value of designing matched treatments that account for particular personality characteristics of at-risk individuals, as well as comorbid psychopathology (Conrod et al., 2000), while also targeting underlying motives for substance misuse (see Watt, Stewart, Conrod, & Schmidt, 2008). Substance use disorders and PG have increasingly been conceptualized as part of the same category of disorders (i.e., addictive disorders), given that they share many features (e.g., tolerance and withdrawal; for a review, see Mudry et al., 2011). This conceptualization has recently been reflected in the 5th edition of the American Psychiatric Association (APA) *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-5*; APA, 2013), as pathological gambling, previously categorized as an impulse control disorder, was reclassified within the substance-related and addictive disorders and renamed gambling disorder. Despite these similarities, the effectiveness of matched-treatment interventions has not been tested among problem gamblers. The present case series aims to address this gap by providing a preliminary assessment of the utility of a motivation-matched treatment intervention approach with this population.

Motivations for Gambling

Motivational models of addictive behaviour have proven useful in understanding the development and maintenance of addictive behaviours (e.g., alcohol; for review, see Cooper, Kuntsche, Levitt, Barber, & Wolf, 2015) and assert that people consume substances to obtain desired outcomes (e.g., regulate positive and negative emotions; Cooper et al., 2015). Given the similarities between gambling disorder and substance use disorders as addictive disorders (e.g., APA, 2013; Mudry et al., 2011) and the co-occurrence of both disorders (e.g., Hodgins & Racicot, 2013), it is likely that common motives underlie gambling and substance use. Indeed, many motivational models argue that desires for mood alteration (i.e., negative affect reduction or positive mood enhancement) underlie various addictive behaviours (Cooper et al., 2015), including gambling (Stewart & Zack, 2008).

Drawing upon such findings, research (Shead & Hodgins, 2009; Stewart, Zack, Collins, Klein, & Fragopulous, 2008) suggests that gamblers can be reliably and validly categorized into one of three subtypes on the basis of their underlying motivations for gambling: (1) escape-motivated gamblers (gamble to cope with or escape from negative emotions, worries, and life concerns); (2) action-motivated gamblers (gamble for enhancement, emotional reward, or the excitement and "rush"); and (3) low emotion regulation gamblers (primary motivation to gamble is unclear, but they are not motivated to gamble to alter internal affective states; instead, they appear to be motivated by external factors, e.g., social affiliation).

The validity of this subtyping scheme has been demonstrated with a variety of clinically relevant criteria, including severity of gambling problems, gambling frequency, and specific gambling outcome expectancies. For example, Yi and colleagues (2015) reported that action-motivated gamblers endorse reward gambling outcome expectancies, whereas escape-motivated gamblers tend to endorse relief gambling outcome expectancies. Research has also found that escape and action motives are strongly associated with PG, whereas social-affiliative motives are more likely to be primarily endorsed by non-problem gamblers and low emotion regulation gamblers (Stewart & Zack, 2008). Escape and action motives are both strongly associated with PG, and problem gamblers with these motives tend to be more resistant to treatment (Daughters, Lejeuz, Lesieur, Strong, & Zvolensky, 2003; Leblond, Ladouceur, & Blaszczynski, 2003). However, escape-motivated gambling is normally characterized by more severe gambling problems and action-motivated gambling by more frequent and excessive gambling behaviour (Stewart & Zack, 2008). This finding is consistent with the broader addictions literature that has consistently found motivations involving coping with negative emotions to be most strongly associated with problematic forms of addictive behaviours (e.g., Birch, Stewart, & Zack, 2006; Cooper, Russell, Skinner, & Windle, 1992). However, the utility of this subtyping scheme for informing treatment-matching efforts aimed at improving PG treatment outcomes remains to be determined.

The most common treatment for PG is CBT (Daughters et al., 2003; Leblond et al., 2003; Rash & Petry, 2014). Despite a range of CBT-based treatments for PG, however, only moderate response rates have been found among gamblers who receive such treatments (see Gooding & Tarrier, 2009, for a review), and this is particularly the case among escape and action-motivated gamblers (Daughters et al., 2003; Leblond et al., 2003). Such findings clearly point to the need to improve on the current therapeutic interventions for PG. One strategy to accomplish this is by designing treatments that target specific subtypes of gamblers. Drawing upon a cognitive-behavioural framework, the premise of motivation-matched treatment for gamblers is to expand on traditional CBT by including components that differentially identify and modify the types of psychological factors (e.g., maladaptive beliefs) related to gambling exhibited by each subtype of gambler (action- and escape-motivated).

Over and above traditional CBT, the goal of gambling-matched treatment is to target the beliefs that impede control of gambling behaviour and to extinguish operant and classic conditioning related to gambling activities, environments, and associated stimuli (i.e., sounds, images, and objects such as money) that make gamblers susceptible to approaching gambling situations. Because these processes are distinct to each subtype of gambler (e.g., action-motivated gamblers perceive gambling as a means of excitement, whereas escape-motivated gamblers perceive it as a means of relieving distress), and because gambling-matched treatment accounts for such differences (Stewart et al., 2011), we hypothesized that matched treatments would lead to positive treatment outcomes in both escape- and action-motivated gamblers. The purpose of the present pilot case series was to conduct a preliminary assessment of the effectiveness of a novel, motivation-matched treatment for PG

before recommending it for more rigorous experimental assessment (i.e., via a randomized controlled trial).

Method

Participants

Participants were recruited from clinician referrals (local community addictions prevention or treatment programs), posters, and referrals from a gambling telephone helpline. Inclusion criteria for the current pilot case series were as follows: (1) classification as a problem gambler[1] (i.e., Problem Gambling Severity Index [PGSI] score of 8 or more; Ferris & Wynne, 2001); (2) proficiency in written and spoken English; (3) minimum 19 years of age; and (4) ability to provide written informed consent. Exclusion criteria included (1) gambling abstinence longer than 2 months prior to intake; (2) concurrently seeking treatment for PG from another therapist; (3) current or lifetime history of psychosis; (4) current alcohol or substance dependence; and (5) current suicidal intent or suicide attempts within the past 5 years. The latter three criteria were exclusionary because of concerns that the needs of problem gamblers with these comorbidities might not be met within this brief intervention.

Nineteen prospective participants passed the telephone screening and were invited for intake assessment (described in the following section). Twelve completed intake assessment and met the inclusion and exclusion criteria. Of these, two withdrew prior to treatment, one after session two, two after session four, and one after session five (all for unknown reasons). As outcome data were not collected for these latter six, they were excluded. The remaining participants who completed all treatment sessions, the post-treatment assessment, and at least one of the follow-up sessions consisted of six Caucasian males who ranged in age from 34 to 56 years (M = 46.33, SD = 9.97). All were employed, four were married, one was single, and one was separated; all had a grade 12 education and three had postsecondary education; and all were classified as problem gamblers on the PGSI (M = 17.17, SD = 5.71, range 10–23). On the basis of their primary motivations for gambling (Gambling Motives Questionnaire [GMQ]; Stewart & Zack, 2008), participants received either action-motivated (n = 4) or escape-motivated (n = 2) treatment.

Measures

Screening measures.

PG symptoms. The nine-item PGSI scale of the Canadian Problem Gambling Index (CPGI; Ferris & Wynne, 2001) assessed the presence and severity of gambling problems during pre-treatment screening. For each item (e.g., "Have you bet more

[1]Although the current study recruited problem gamblers whose gambling problem severity was classified as "high risk" on the CPGI (i.e., score of 8 or more), the *BEAT Gambling* treatment is also designed for use in individuals who exhibit scores in the "moderate risk" range of problem gambling severity (PGSI score 3–7).

than you could really afford to lose?"), respondents indicated how frequently they engaged in the behaviour or experienced the consequence in the last 12 months on a scale that ranged from 0 (*never*) to 3 (*almost always*), and those who had a total score of 8 or more were classified as "high risk" or "problem gamblers."

Comorbid mental health issues. The Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version, Patient Edition with Psychotic Screen (SCID-I/P W/PSY SCREEN; First, Spitzer, Gibbon, & Williams, 2002) established current and lifetime Axis I disorders for descriptive purposes and to determine eligibility.

Gambling motives. The 15-item GMQ (Stewart & Zack, 2008) assessed reasons for gambling (i.e., coping, enhancement, social motives). Participants rated how frequently they gambled for each of 15 reasons (e.g., "to relax"; "because it's exciting"; "to be sociable") on a scale that ranged from 1 (*almost never or never*) to 4 (*almost always*) and the result was used to categorize participants as "escape"- or "action"-motivated gamblers (based on which subscale had the highest *z*-score by using means and standard deviations from Stewart & Zack, 2008) and to assign them to the appropriate matched treatment.

Primary outcome measures.

Gambling participation. A modified Gambling Activities Screen (GAS; Doiron & Nicki, 2007) assessed changes in gambling participation (e.g., frequency, time spent, money spent) over the past 7 days.

PG severity. The National Opinion Research Center DSM Screen for Gambling Problems (NODS; Gerstein et al., 1999) assessed gambling problems by using 17 items (scored yes or no), with higher scores indicating increased levels of gambling problems. Questions were framed to assess gambling problems over the past 3 months.

Impairment or disability. The three-item Sheehan Disability Scale modified for gambling (SDS-G; Hodgins, 2013) assessed impairment (work, family, social functioning) related to gambling problems. Participants rated each item (e.g., "To what extent has your gambling problem disrupted your work or studies in the past month?") on a scale that ranged from 0 (*not at all*) to 10 (*extremely*).

Secondary outcome measures.

Craving to gamble. Drawing upon previous research (Tavares, Zilberman, Hodgins, & el-Guebaly, 2005), a five-item modified version of the Penn Alcohol Craving Scale (PACS; Flannery, Volpicelli, & Pettinati, 1999) measured gambling-related craving over the past 7 days. Participants rated frequency, time spent thinking about gambling, difficulty in resisting relapse opportunities, and strength of craving (e.g., "How often have you thought about gambling or about how good gambling would make you feel during the past seven days?") on a scale that ranged from 0 (*never, none, not at all*) to six (*nearly all, strong, all the time*).

Gambling abstinence self-efficacy. The 21-item Gambling Abstinence Self-Efficacy Scale (GASS; Hodgins, Peden, & Makarchuk, 2004) measured participants' confidence in their ability to control, reduce, or abstain from gambling. For each item, participants indicated how confident they were that they would not gamble (or gamble heavily) in a specific situation (e.g., "I wanted to win"; "I felt pressured by financial debts") on a scale that ranged from 0 (*not at all confident*) to 5 (*extremely confident*).

Positively and negatively reinforcing gambling situations. The 63-item Inventory of Gambling Situations (IGS; Turner & Littman-Sharp, 2001) assessed the frequency of gambling in high-risk situations. Previous research (Stewart et al., 2008) found that the original 10 subscales load on two factors: one that positively reinforces gambling situations (e.g., pleasant emotions, need for excitement) and one that negatively reinforces gambling situations (e.g., worried over debt, unpleasant emotions). Participants rated each item (e.g., "When I was worried about my debts"; "When I felt confident about my gambling skills") on a scale that ranged from 1 (*almost never or never gambled heavily in that situation*) to 4 (*almost always gambled heavily in that situation*).

Affect-regulation gambling outcome expectancies. The 18-item Gambling Affect Expectancy Questionnaire (GAEQ; Shead & Hodgins, 2009) assessed self-reported positive affect-regulation gambling outcome expectancies for reward (e.g., "It would be wonderful to gamble now) and relief (e.g., "I would feel less tense if I gambled now") expectancies. Participants indicated how much they agreed or disagreed with each item on a scale that ranged from 1 (*strongly disagree*) to 7 (*strongly agree*).

The reliability coefficients (i.e., Cronbach's alpha) for these primary and secondary outcome measures are presented in Table 1.

Table 1
Reliability Coefficients (Cronbach's Alpha) and Sources for Outcome Measures

Instrument	Reliability (Cronbach's alpha)	Source
NODS	0.98	Gerstein et al., 1999
PACS	0.92	Ashrafioun et al., 2012
GASS	0.93	Hodgins et al., 2004
IGS		
Positive	0.90	Turner et al., 2013
Negative	0.95	
GAEQ		
Reward	0.90	Yi et al., 2015
Relief	0.94	
SDS-G	0.81	Hodgins, 2013

Note. NODS = National Opinion Research Center Diagnostic Screen for Gambling Problems; PACS = Penn Alcohol Craving Scale; GASS = Gambling Abstinence Self-Efficacy Scale; IGS = Inventory of Gambling Situations; GAEQ = Gambling Affect Expectancy Questionnaire; SDS-G = Sheehan Disability Scale modified for gambling.

Procedure

Six sessions of individual treatment were delivered over 6 weeks. Assessments were conducted at pre-treatment, post-treatment, and 3- and 6-month follow-up.

Assessment. Participants were screened by telephone and those who were eligible were invited to the university for a pre-treatment intake assessment, where they provided written informed consent, underwent the SCID-I/P (First et al., 1998), and completed the GMQ (Stewart & Zack, 2008) and the pre-treatment outcome measures. Eligible participants scheduled a time to commence treatment within 3 weeks of intake assessment. Self-report questionnaires were re-administered three times following treatment: at post-treatment and at 3- and 6-month follow-up sessions.

Treatment protocol. The treatment program *Brief Escape and Action Treatment for Gambling (BEAT Gambling)* is a novel manualized treatment program for problem gamblers (Stewart et al., 2011) consisting of six sessions of individual treatment, delivered over 6 weeks. Sessions were held approximately 1 week apart. Sessions one to four were 90 min long and sessions five and six were 60 min long. Those who could not attend their session rescheduled the following week. Each session taught skills to manage gambling. Drawing upon a cognitive-behavioural framework, therapists (doctoral-level licensed psychologists, supervised clinical psychology graduate students) delivered treatment designed to address specific maladaptive motivations for gambling, as well as the conditioning and unhelpful thinking patterns unique to each subtype.

In session one, all clients shared their history of PG and reflected on what brought them to treatment. They were given feedback about their gambling, introduced to the model of gambling maintenance for treatment (i.e., action-escape model of gambling maintenance), and presented with a decisional balance exercise that examined motivations for seeking treatment. Clients set their goal for treatment (i.e., controlled gambling or abstinence), discussed strategies to help them succeed, and were given a handbook that outlined options to consider when making changes in their gambling.

In session two, all clients were educated on how randomness works in games of chance and were introduced to the functional analysis. Completing functional analyses on any urges or slips that clients experienced formed the basis of a large proportion of the homework assigned between sessions. In action-motivated treatment, time was spent teaching clients to evaluate and consider alternatives to gambling that may be as rewarding or exciting without the negative consequences. In escape-motivated treatment, clients learned about healthier ways to manage stress and negative emotions (e.g., progressive muscle relaxation).

During session three, internal and external triggers were introduced, with a focus on functional analysis, but the action- and escape-based treatments differed in

the types of triggers discussed (i.e., action-motivated treatment included physical sensations, thoughts, and feelings such as restlessness, boredom, or feeling the need for excitement; escape-motivated treatment included stress, anxiety, or sadness). Session four focused on either action-based or escape-based maladaptive thinking patterns. This discussion was used to complete a more advanced functional analysis and cognitive restructuring activity.

For action-based treatment, session five introduced the concept of urge surfing (i.e., letting thoughts, emotions, or urges to gamble "just be"; learning that these thoughts or feelings come and go but do not have to lead to gambling). For escape-based treatment, distress tolerance was introduced (i.e., learning to tolerate unpleasant emotions rather than trying to control them). In both treatments, time was spent introducing a relapse prevention plan worksheet (with emphases on either action or escape situations with a high risk for relapse), which clients also worked on for homework. Attention was given to discussing therapy termination and consolidating skills learned in therapy. The sixth session served as a wrap-up with a review of the model of gambling maintenance (i.e., action or escape) and the skills learned in therapy, along with completion of the relapse prevention plan worksheet and reflection on progress during treatment.

Data Analytic Strategy

To assess the clinical significance of treatment outcomes, we used three indicators of individual-level change following treatment: (1) The Reliable Change Index (RCI; Evans, Margison, & Barkham, 1998; Jacobson & Truax, 1991), which provides a more liberal index of change; (2) clinically significant change cutoff scores, which provide a more stringent index of change (Evans et al., 1998; Jacobson & Truax, 1991); and (3) reliable changes defined as being equal to or exceeding a decrease of 50% in gambling behaviour (e.g., Mohr, Boudewyn, Goodkin, Bostrom, & Epstein, 2001).

The RCI is a useful data analytic strategy for small sample sizes in which inferential statistical techniques are deemed inappropriate, such as in a case series (Evans et al., 1998). The RCI uses instrument reliability scores to indicate whether an individual has demonstrated clinically significant improvement from their baseline pre-treatment assessment scores by using the following formula:

$$SE_{Diff} = SD_1\sqrt{2}\sqrt{1-r}$$

Normally, SD_1 denotes the standard deviation (SD) of the baseline observations across study participants. Because of the small sample size (N = 6), instrument SDs were identified in the literature and substituted to provide a more accurate value for the population. This method has been previously used in other clinical pilot studies (e.g., Zlotnick, Johnson, Miller, Pearlstein, & Howard, 2001). Additionally, r denotes the reliability (Cronbach's alpha) of the measure, which was drawn from the literature for

each outcome measure.[2] Reliability coefficients and sources are presented in Table 1; means, *SD*s, and corresponding sources from the literature are presented in Table 2; and the means and standard deviations from the literature are reported alongside those from the sample in Table 3. In line with the recom-mendations of Jacobson and Truax (1991), scores were deemed reliably changed if they exceeded the RCI (cutoff = 1.96) by using the following formula:

$$\mathrm{RCI} = \frac{(X_2) - (X_1)}{SE_{diff}}$$

Where X_1 denotes the subject pre-test score and X_2 the subject post-test score.

Calculating cutoff criteria for clinically significant change is another useful tool in the assessment of clinical treatment efficacy. Cutoff scores were calculated by using the following formula:

$$\mathrm{Cutoff} = \frac{(Mean_{clin} \times SD_{norm}) + (Mean_{norm} \times SD_{Clin})}{SD_{norm} + SD_{Clin}}$$

Scores at or exceeding this cutoff are within the healthy population range and were deemed clinically significant or recovered. Likewise, scores below this cutoff, but exceeding the RCI, were deemed reliably changed or improved (Evans et al., 1998; Jacobson & Truax, 1991).

The aforementioned data analytic strategy was used for all outcome measures (NODS, PACS, IGS, GAEQ, GASS, SDS-G), but was not used to assess changes in GAS outcomes. The GAS comprises a series of single-item measures, and so reliability scores cannot be calculated. Therefore, reliable changes were defined as being equal to or exceeding a decrease of 50% in each gambling behaviour, a method previously used in similar studies in which the use of clinically significant change indicators was inappropriate (e.g., Mohr et al., 2001).

Results

Five participants reported video lottery terminals (VLTs) as their preferred, most problematic form of gambling. As their treatment goal, four chose abstinence from VLT gambling, whereas one (Participant 4; P4) chose to limit VLT gambling to twice per month and $40 per episode. During the third session, P4 reduced his goal to $20 per session. The remaining participant (P3) reported horse racing, sports betting, and poker as his preferred, most problematic forms of gambling and chose abstinence as his goal. At post-treatment, one participant (P4) achieved abstinence,

[2]Cronbach's reliability coefficients were calculated for the sample (N = 6) and ranged from .84 (GAEQ relief and SDS-G) to .97 (GAEQ reward and PACS), indicating good reliability of all outcome measures. The results are consistent when either set of coefficients is used in data analysis (i.e., literature vs. sample).

Table 2
Means, Standard Deviations, Sources for Outcome Measures, and Cutoff Scores

	Population							
	Healthy control			Pathological gambling				
Instrument	*M*	*SD*	Source	*M*	*SD*	Source	Reliable change (RCI)	Clinical cutoff score
NODS	0.3	0.4	Ledgerwood et al., 2012	8	1.7	Ledgerwood et al., 2012	2.2	1.8
PACS	4.6	5.4	Ashrafioun, McCarthy, and Rosenberg, 2012	21.8	8.6	Caselli and Spada, 2015	6.7	11.2
GASS	73.7	36.6	Winfree, Meyers, and Whelan, 2015	46.3	23.9	Hodgins, Currie, Currie, and Fick, 2009	17.5	57.1
IGS	6.9	2.2	Dowling, Lorains, and Jackson, 2015	64.3	17.8	Stewart and Wall, 2005	15.6	13.0
Positive								
Negative	6.6	2.2		45.2	20.8		12.9	10.2
GAEQ	25.0	9.0	Stewart and Wall, 2005	32.4	10.5	Yi et al., 2015	9.2	28.4
Reward								
Relief	15.9	7.7		32.6	12.0		8.1	22.4
SDS-G	0.7	1.5	Huppert, Simpson, Nissenson, Liebowitz, and Foa, 2009	3.2	2.8	Black et al., 2007	2.8	1.5
Family								
Work	0.9	2.3		4.0	3.1		2.4	2.2
Social	0.6	1.1		3.3	2.6		2.6	1.4

Note. RCI = Reliable Change Index; NODS = National Opinion Research Center Diagnostic Screen for Gambling Problems; PACS = Penn Alcohol Craving Scale; GASS = Gambling Abstinence Self-Efficacy Scale; IGS = Inventory of Gambling Situations; GAEQ = Gambling Affect Expectancy Questionnaire; SDS-G = Sheehan Disability Scale modified for gambling.

Table 3
Comparison of Population Means and Standard Deviations With Sample Means and Standard Deviations

	Population					
	Healthy control		Pathological gambling		Sample	
Instrument	*M*	*SD*	*M*	*SD*	*M*	*SD*
NODS	0.3	0.4	8.0	1.7	7.7	2.9
PACS	4.6	5.4	21.8	8.6	15.5	8.0
GASS	73.7	36.6	46.3	23.9	50.7	23.1
IGS	6.9	2.2	64.3	17.8	41.8	21.8
Positive						
Negative	6.6	2.2	45.2	20.8	42.4	18.1
GAEQ	25.0	9.0	32.4	10.5	32.1	17.4
Reward						
Relief	15.9	7.7	32.6	12.0	29.8	11.5
SDS-G	0.7	1.5	3.2	2.8	6.8	3.4
Family						
Work	0.9	2.3	4.0	3.1	3.8	3.1
Social	0.6	1.1	3.3	2.6	4.8	3.5

Note. NODS = National Opinion Research Center Diagnostic Screen for Gambling Problems; PACS = Penn Alcohol Craving Scale; GASS = Gambling Abstinence Self-Efficacy Scale; IGS = Inventory of Gambling Situations; GAEQ = Gambling Affect Expectancy Questionnaire; SDS-G = Sheehan Disability Scale modified for gambling.

whereas the remaining five reported gambling one to two times over the course of treatment. Overall, all six treatment completers displayed significant reductions or improvements from pre- to post-treatment on various outcome measures (Table 4).

Primary Outcome Measures

Gambling participation. On the GAS, four participants (67%) reported post-treatment reductions in gambling activity (i.e., frequency, time, money). Three participants (P3, P4, P6) considerably reduced gambling frequency, and four (P2, P3, P4, P6) significantly reduced the amount of time and money spent gambling, which were maintained at follow-up. P1 reported no change in gambling frequency and an increase in the amount of time and money spent gambling post-treatment, whereas P5 reported no significant change in gambling frequency, time, or the amount of money spent gambling post-treatment. Despite this, significant reductions in all three measures of gambling participation were observed at follow-up for these two participants.

PG severity. For PG severity (NODS; Gerstein et al., 1999), three participants (P4, P5, P6) showed significant reductions at post-treatment (50%), which were maintained at follow-up. The remaining participants (P1, P2, P3) showed no

Table 4
Raw Scores and Percentage Change in Scores From Treatment Completers on Outcome Measures

Participant	Measure		Pre-treatment	Post-treatment	3-Month follow-up	6-Month follow-up	% Reduction from pre- to post-treatment	% Reduction from pre-treatment to 3-month follow-up	% Reduction from pre-treatment to 6-month follow-up
P1[a]	**GAS**	Frequency	1	1	1	-	0	0	-
Escape		Time	30	120	120	-	-300	-300	-
		Money	45	140	140	-	-211	-211	-
	NODS		8	9	2*	-	-13	75	-
	SDS-G	Work	3	1**	0**	-	67	100	-
		Social	9	8	3*	-	11	67	-
		Family	9	9	3*	-	0	67	-
	PACS		20	4**	6**	-	80	70	-
	GASS		65	97*	71	-	49	9	-
	IGS	Positive	42.46	44.88	18.13	-	-6	57	-
		Negative	47.67	53.92	26.1*	-	-13	45	-
	GAEQ	Reward	51.5	11**	28**	-	78	46	-
		Relief	39	12**	14**	-	69	64	-
P2[b, c]	**GAS**	Frequency	2	2	-	0*	0	-	100
Escape		Time	480	240*	-	0*	50	-	100
		Money	670	100*	-	0*	85	-	100
	NODS		8	8	-	7	0	-	14
	SDS-G	Work	6	9	-	5	-33	-	16
		Social	6	7	-	7	-14	-	-14
		Family	7	9	-	7	-22	-	0
	PACS		16	7**	-	8**	56	-	50
	GASS		48	81**	-	44	-25	-	8
	IGS	Positive	35.08	54.09	-	33.02	-54	-	6
		Negative	42.49	52.19	-	36.5	-23	-	14
	GAEQ	Reward	25	24	-	17	4	-	32
		Relief	39	22**	-	35	44	-	10

Table 4
Continued

Participant	Measure		Pre-treatment	Post-treatment	3-Month follow-up	6-Month follow-up	% Reduction from pre- to post-treatment	% Reduction from pre-treatment to 3-month follow-up	% Reduction from pre-treatment to 6-month follow-up
P3[a]	**GAS**	Frequency	17	2*	0*	-	88	100	-
Action		Time	3420	250*	0*	-	92	100	-
		Money	1420	200*	0*	-	86	100	-
	NODS		10	10	8	-	0	20	-
	SDS-G	Work	8	9	5	-	-13	38	-
		Social	8	9	5*	-	-13	38	-
		Family	9	9	7	-	0	22	-
	PACS		23	20	16*	-	13	30	-
	GASS		16	55*	44*	-	-71	-64	-
	IGS	Positive	76.55	56.27	45.63*	-	27	40	-
		Negative	63.07	58.92	48.65*	-	7	23	-
	GAEQ	Reward	51	42	41	-	18	20	-
		Relief	31	38	38	-	-23	-23	-
P4[a]	**GAS**	Frequency	3	0*	3	-	100	0	-
Action		Time	130	0*	32*	-	100	75	-
		Money	128	0*	48*	-	100	63	-
	NODS		2	0**	0**	-	100	100	-
	SDS-G	Work	0	0	0	-	0	0	-
		Social	0	0	0	-	0	0	-
		Family	0	0	0	-	0	0	-
	PACS		0	1	4	-	-100	-400	-
	GASS		85	100	95	-	-18	-12	-
	IGS	Positive	8.49	7.3	9.05	-	14	-7	-
		Negative	10.42	15.5	10.71	-	-49	3	-
	GAEQ	Reward	12	9	15	-	25	-25	-
		Relief	9	9	9	-	0	0	-
P5	**GAS**	Frequency	2	2	1*	1*	0	50	50
Action		Time	200	120	5*	1*	40	98	100
		Money	100	100	10*	4*	0	90	96
	NODS		9	4*	3*	4*	56	67	56
	SDS-G	Work	5	5	0**	0**	0	100	100

Table 4
Continued

Participant	Measure		Pre-treatment	Post-treatment	3-Month follow-up	6-Month follow-up	% Reduction from pre- to post-treatment	% Reduction from pre-treatment to 3-month follow-up	% Reduction from pre-treatment to 6-month follow-up
		Social	2	4	0**	0**	-100	100	100
		Family	8	8	5*	4*	0	38	50
	PACS		16	13	13	13	19	19	19
	GASS		48	94**	87**	83**	96	89	81
	IGS	Positive	45.52	37.5	29.52*	26.51*	18	35	42
		Negative	36.61	22.16*	23.64*	30.52	39	35	16
	GAEQ	Reward	38	17**	22**	22**	55	42	42
		Relief	36	13**	13**	12**	64	64	67
P6	**GAS**	Frequency	4	1*	0*	1*	75	100	75
Action		Time	101	1*	0*	1*	99	100	99
		Money	211	2*	0*	5*	99	100	98
	NODS (year/3 months)		9	1**	0**	0**	89	100	100
	SDS-G	Work	1	0	0	0	100	100	100
		Social	4	1**	0**	0**	75	100	100
		Family	8	1**	0**	0**	88	100	100
	PACS		18	16	0**	0**	11	100	100
	GASS		42	85**	99**	100**	103	148	150
	IGS	Positive	42.62	42.26	31.83	25.04*	1	25	41
		Negative	53.85	44.58	34.36*	19.14*	17	36	65
	GAEQ	Reward	15	15	9	9	0	40	40
		Relief	25	16**	9**	9**	36	64	64

Note. GAS = Gambling Activities Screen (over past 7 days); NODS = National Opinion Research Center Diagnostic Screen for Gambling Problems; PACS = Penn Alcohol Craving Scale; GASS = Gambling Abstinence Self-Efficacy Scale; IGS: Inventory of Gambling Situations; GAEQ = Gambling Affect Expectancy Questionnaire; SDS-G = Sheehan Disability Scale modified for gambling. [a]3-month follow-up data not available for P2. [b]6-month follow-up data not available for P1, P3, and P4. [c]P2 voluntarily abstained from gambling for 7 days prior to treatment and so timeline follow-back data were used to calculate baseline GAS score.
* Reliable change.
** Clinically significant change.

improvement by post-treatment; however, P1 displayed a reliable improvement by the 3-month follow-up (67%).

Impairment or disability. On the SDS-G (Hodgins, 2013), treatment decreased functional impairment or disability for P1 and P6 post-treatment (33%), with improvements by P1 at work and by P6 in social and family life, which were maintained at follow-up. By the 3-month follow-up, P1 also significantly improved in social and family functioning. P3 and P5 exhibited no immediate changes post-treatment, but showed a significant decrease in impairment by follow-up. P2 and P4 did not report improvement in any of the domains of impairment. However, P4 reported no functional impairment related to gambling problems at pre-treatment, and this remained the same at post-treatment and follow-up. In summary, 67% of participants showed some improvements in functional impairment or disability following treatment.

Secondary Outcome Measures

Craving to gamble. P1 and P2, both escape motivated, exhibited significant post-treatment reductions in craving to gamble (PACS), which were maintained at follow-up. Action-motivated gamblers did not exhibit post-treatment reductions, but two additional participants (P3, P6) showed significant improvement by the 3-month follow-up, increasing the proportion of significant responders to 67%. One action-motivated participant (P4) was already within the clinically healthy range at baseline, and so significant improvement on this measure was not anticipated. One participant (P5-action) did not exhibit reductions in gambling-related craving at any of the time points.

Gambling abstinence self-efficacy. Considerable improvements were observed in participants' confidence in their ability to abstain from or to control gambling on the GASS (Hodgins et al., 2004). All participants reported increased gambling abstinence self-efficacy at post-treatment (83%), with the exception of P4, whose baseline score was already within the clinically healthy range at baseline. Likewise, P1 was already within the healthy range, but his gambling abstinence self-efficacy nonetheless reliably increased from pre- to post-treatment. All treatment gains were maintained with the exception of P2, whose score had returned to baseline by the 6-month follow-up.

Positively and negatively reinforcing gambling situations. In relation to the assessment of high-risk situations associated with gambling (IGS; Turner & Littman-Sharp, 2001), little improvement was observed post-treatment, with one participant (P5) displaying a significant reduction in gambling in negatively reinforcing gambling situations. In contrast to the overall lack of treatment gains on this measure post-treatment, reliable improvements were shown by most participants at follow-up. P1 and P6 improved in response to negative gambling situations by the 3-month follow-up, and P6 improved in response to positive situations by the 6-month follow-up. P3 and P5 improved in positive and negative situations by

the 3-month follow-up, but only P5's treatment gain in positive situations persisted at the 6-month follow-up. P4's baseline assessment was already within the clinically healthy range at baseline, and so improvement was not anticipated. Taken together, 67% of participants showed some improvements on this measure following treatment.

Affect-regulation gambling outcome expectancies. On the GAEQ (Shead & Hodgins, 2009), two participants (P1, P5) exhibited significant reductions in their endorsement of reward and relief outcome expectancies by post-treatment, which were maintained at follow-up. For reward outcome expectancies, three participants (P2, P4, P6) were in the clinically healthy range at baseline, and so improvements were not expected. For relief outcome expectancies, two participants (P2, P6) displayed significant reductions in outcome expectancies; however, treatment gains were maintained only for P6 at follow-up. Only one participant (P3) did not improve. Again, P4 was already within the clinically healthy range at baseline, and so improvements were not anticipated. In summary, 67% of participants showed a reduction in their endorsement of reward and relief outcome expectancies following treatment.

Discussion

The current pilot case series provided a preliminary investigation of the efficacy of a cognitive behavioural treatment for PG (*BEAT Gambling*) that is matched to gamblers' primary underlying motivations (i.e., *escape-motivated* vs. *action-motivated* gamblers). Results provide support for the merits of this novel treatment as a potentially effective intervention for PG. Participants' scores on the primary outcome measures revealed considerable pre- to post-treatment reductions: 100% of participants exhibited significant post-treatment gains on at least one primary outcome measure. Overall, four participants (67% of the sample) exhibited a significant reduction in gambling activity post-treatment, with five participants (83% of the sample) displaying reduced gambling activity by follow-up. Specifically, one participant (P4) abstained from gambling and three (P2, P3, P6) exhibited a marked reduction in gambling. The gambling activity of two participants (P1, P5) was not significantly reduced post-treatment, but P5 significantly reduced his gambling activity across all domains (frequency, time, money) by the 3-month follow-up, which was maintained at the 6-month follow-up. Post-treatment reductions in PG severity were observed for three participants (50% of the sample), with another participant exhibiting a delayed response; 67% of the sample exhibited significantly reduced impairment in PG severity by the follow-up period. For functional impairment or disability associated with gambling (SDS-G), two participants (33%) exhibited significant improvements by post-treatment, which were retained at follow-up. Two participants (P3, P5) exhibited a delayed response, with no immediate improvements post-treatment, but improvement by follow-up. Overall, 67% of the sample exhibited a significant reduction in the degree of disability or impairment that resulting from gambling by the follow-up assessment.

Secondary outcome measures revealed pre- to post-treatment reductions in craving to gamble (33%) and the endorsement of reward (33%) and relief (67%) gambling outcome expectancies, as well as noteworthy increases in participants' confidence in their ability to control or abstain from gambling (83%) at post-treatment. These treatment gains were largely maintained at the 3- and 6-month follow-up. Although only modest changes were observed in participants' pre- to post-treatment scores on measures assessing gambling in high-risk situations, in the majority of cases, treatment gains were observed at the 3-month follow-up that were largely maintained at the 6-month follow-up.

For some participants, gains on certain measures were not observed post-treatment, but were apparent at follow-up assessment (i.e., SDS-G, PACS, IGS). One explanation for this finding is the "sleeper effect," in which treatment gains increase over time—an effect that has been reported in previous clinical trials that assessed the effectiveness of CBT (e.g., Carrollet al., 2009). The sleeper effect has been attributed to learning mechanisms that improve affective control and cognitive functioning over time (Potenza, Sofuglu, Carroll, & Rounsaville, 2011). In the present study, treatment gains may have increased over time because participants acquired skills in therapy but did not have an opportunity to fully apply them by the post-treatment assessment. Once applied, the experience may have elicited the extinction of gambling-related urges and behaviours in response to triggers, thus accounting for treatment gains at follow-up assessment. In addition, one of the outcome measures assessed gambling impairment or disability (i.e., SDS-G), and one would expect to observe changes in gambling behaviour following treatment prior to observed reductions in gambling impairment or disability (e.g., it would take some time to recover from family and financial disruption due to gambling). Lastly, the outcome measures used in the current study were previously validated instruments for use with problem gamblers and used varying timelines (e.g., GAS: past 7 days vs. NODS: past 3 months). It is possible that the minimal post-treatment change observed on some outcome measures may be due to the long assessment time frame. For example, the NODS assesses PG severity over 3 months. Because the time gap between pre-treatment and post-treatment assessment was 6 weeks, immediate improvements may not be apparent post-treatment but are observable at follow-up. Future outcome studies may consider using a consistent time frame of assessment across outcome measures.

A number of limitations of the current study should be noted. First, the retention rate for this study was low (50%). Although high dropout rates are a commonly reported barrier to CBT treatment of PG (Rash & Petry, 2014), it is important to consider the possibility that the participants retained in this study may have differed regarding their motivation to abstain from gambling relative to the dropouts. Additionally, all but one participant in the current study reported VLTs as their most problematic form of gambling. As such, results may not generalize to gamblers who report other forms of gambling (e.g., poker, online gambling) as most problematic. That said, VLT gambling is a relatively more addictive form of gambling (Doiron &

Nicki, 2001) and as a consequence, problematic VLT gamblers may be an ideal population to assess the effectiveness of a novel PG treatment. Nonetheless, further research should assess the clinical utility of this motivation-matched PG treatment in samples of non-VLT problem gamblers.

One additional limitation relates to the means by which gamblers were classified in the current study classification of gamblers. Specifically, participants were classified within the motivational group on the basis of their highest *z*-score on the GMQ coping and enhancement scales (Stewart & Zack, 2008). In the event that a participant's scores were high on both measures, they could not be classified as a "pure" action or escape gambler. Future research could examine whether such dually motivated gamblers respond differently to the matched treatment than do those who are more purely motivated to gamble as a means of coping or excitement.

Baseline scores were consistently low for P4, who was already within the normal population range on many of the outcome measures. This led to a potential floor effect, in which treatment gains could not be observed at the post-treatment and follow-up assessments. Regardless of this, P4 scored within the PG range on the PGSI during pre-screening and responded well to treatment, exhibiting treatment gains in overall gambling behaviour that were largely maintained at follow-up. Because of the design of the present case series pilot study, treatment gains were evaluated individually via indicators of reliable and clinically significant change (Jacobson & Truax, 1991). Therefore, we decided to include P4 in the analyses, despite low baseline scores on many of the outcome measures. It is important to note that because P4 exhibited a reduction in gambling following treatment but no reliable change on the secondary outcomes, conclusions cannot be drawn with respect to the mediators of his changes in gambling behaviour (e.g., increased self-efficacy to abstain from heavy gambling).

The results of the current research point to the possible utility of this intervention as a potentially viable treatment for PG. They also provide support for a more comprehensive assessment of the utility of the *BEAT Gambling* intervention. That said, because of the small sample size, conclusions about overall treatment effectiveness should be drawn tentatively. The goal of the present pilot case series was to assess the potential of the motivation-matched treatment for further more rigorous experimentation. In order to ensure that improvements from pre-treatment levels observed in the present study reflect treatment effects rather than extraneous factors (e.g., regression to the mean on the outcome measures), a replication of this pilot study with a larger sample size, randomization, and comparison to a treatment-as-usual control is needed.

In summary, given the positive outcomes in this study and the overall magnitude of change on the majority of outcome measures, further research investigating the efficacy of targeting underlying motives as part of interventions for PG is certainly warranted. In addition to a randomized controlled trial, future research should examine the role of theoretically relevant mediators of treatment change and assess

whether such differences are due, for example, to matched treatment-induced changes in affect-regulation gambling outcome expectancies (i.e., reward and relief gambling outcome expectancies on the GAEQ; Shead & Hodgins, 2009), or to co-morbid psychopathology (e.g., changes in co-morbid mood and anxiety disorder diagnoses mediate the treatment effects in the escape-motivated treatment).

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