Journal of Evidence-Based Psychotherapies,
Vol. 20, No. 1, March 2020, 107-134.

EFFECTIVENESS OF A MINDFULNESS-BASED COGNITIVE THERAPY GROUP INTERVENTION IN REDUCING GAMBLING-RELATED CRAVING

Alejandra Rebeca MELERO VENTOLA[1], José Ramón YELA[1,], Antonio CREGO[1], María CORTÉS-RODRÍGUEZ[2]*

[1] Dr., Faculty of Psychology, Pontifical University of Salamanca, Spain

[2] Faculty of Sciences, Department of Statistics, University of Salamanca, Spain

Abstract

Mindfulness practices focus on increasing awareness and developing acceptance and compassionate attitudes. Mindfulness-based interventions have been suggested as a promising approach for the treatment of behavioral addictions involving automatic behavioral patterns, gambling-related cognitions, drive for gambling and craving. This study compares the effectiveness of a mindfulness-based cognitive therapy (MBCT) intervention with a mutual-aid group intervention, the standard intervention provided in pathological gamblers' associations, in reducing gambling-related craving. A repeated-measures design was used involving 33 participants who first attended a mutual-aid group intervention and then received an 8-week MBCT training. The participants' levels of mindfulness and craving (intensity, frequency and urge) were assessed before and after both interventions (T1, T2, and T3). The follow-up measures were performed one (T4), three (T5) and six months (T6) after the MBCT training. The results revealed that the mutual-aid group intervention produced only moderate reductions in craving intensity (η^2=0.27). In contrast, the MBCT program significantly increased the scores of the mindfulness-related variables (η^2 ranging from 0.84 to 0.99) and reduced the craving intensity (η^2=0.95), frequency (η^2=0.93) and urge (η^2=0.91). Overall, the mindfulness scores were maintained at high levels, whereas the craving-related scores were low at the end of the MBCT

* Correspondence concerning this article should be addressed to Dr. José Ramón Yela, Ph. D. Faculty of Psychology. Pontifical University of Salamanca. Calle Compañía, 5. E37002. Salamanca (SPAIN). Phone: +34 923 277 100 Ext. 7624; Email: jryelabe@upsa.es

Conflict of Interest: The authors declare that they have no conflict of interest.

Ethics and Informed Consent: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee (Committee for Ethics in Research, Pontifical University of Salamanca, Reference: Acta 17/07/18-Anexo I) and with the 1964. Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all participants for being included in the study.

intervention and at the one-month, three-month, and six-month follow ups. As a practical implication, accurately describing feelings observed when craving arises, perceiving them as something transitory without judgment, and not reacting immediately to the internal experience, are dimensions of mindfulness associated with decreased craving in pathological gamblers.

***Keywords*:** mindfulness; mutual-aid groups; craving; pathological gambling; mindfulness-based cognitive therapy

Introduction

Gambling addiction has emerged as a relevant public health issue in recent years (Korn & Shaffer, 1999); this issue has important social consequences, especially among young populations. For instance, in a recent meta-analysis, Nowak and Aloe (2014) found that the prevalence of pathological gambling among university students was 10.23%, which far exceeded previous findings and is likely related to the expansion of online gaming (Jiménez-Murcia, Fernández-Aranda, Granero & Menchón, 2014).

Pathological gambling was considered an "impulse-control disorder" for many years. However, the DSM-5 published in 2014 included gambling-related problems in a new section titled "substance-related and addictive disorders". Therefore, gambling addiction is considered to present features similar to those of other addictions, such as craving, the loss of control, and dependence (Echeburúa, Salaberría, & Cruz-Sáez, 2014; Romanczuk-Seiferth, Van den Brink & Goudriaan, 2014; Wölfling *et al.*, 2011). Craving refers to the subjective need to consume a substance or practice some addictive behavior. As argued below, how pathological gamblers cope with craving may be a decisive point in problem maintenance.

Automatic behavior in pathological gambling

An important concern in gambling addiction is the high risk of relapse, which has increased interest in the factors that predict relapse. Pathological gambling typically involves automatic behavioral patterns such that the person impulsively responds to triggering stimuli. Therefore, recent research has identified gaming-related cognitions, drive for gambling, and craving as strong predictors of relapse among gambling addicts (Smith et al., 2015). Similarly, Ashrafioun and Rosenberg (2012) reviewed theories of disordered gambling and found that, in addition to other factors, craving is usually assumed to be a stimulus eliciting relapse. Moreover, these authors suggested that assessing a person's craving may be complicated due to the influence of cognitive-related variables (e.g., craving as a stable preoccupation vs. craving as an acute and fluctuating urge experience), the pathological gamblers' degree of awareness, and their ability to report the

experience of craving. In addition to methodological implications, this idea highlights the need to consider not only craving but also how pathological gamblers manage cravings (i.e., their thoughts about the urge, how they attempt to manage the desire to gamble, etc.) to obtain a complete view of craving-related issues.

Limitations of common treatments for relapse prevention in gambling addiction

Cognitive-behavioral therapy (CBT) is the main approach used for the treatment of pathological gambling, and empirical evidence supports its efficacy (Westphal, 2008). Research has found that CBT is effective in individual interventions, and in combination with other approaches like motivational enhancement therapy, aimed at abstinence or controlled gambling, Internet-based therapy, and self-help workbooks (De Lisle, Dowling and Allen, 2011). However, despite being among the most efficient treatments available, the relatively frequent lack of response to CBT and the high rates of relapse are strong limitations of this type of intervention (López Viets & Miller, 1997; Chrétien, Giroux, Goulet, Jacques & Bouchard, 2017; Gooding & Tarrier, 2009; McIntosh & O'Neill, 2017; Menchon, Mestre-Bach, Steward, Fernández-Aranda & Jiménez-Murcia, 2018).

Alternative approaches for the treatment of disordered gambling originate from pathological gamblers' associations and usually mirror the 12-step model used in Alcoholics Anonymous. Thus, these associations consider pathological gambling a chronic disorder, and total abstinence is the therapeutic aim. This type of association mainly works on a community basis to help members cope with gambling-related problems. The treatments are usually provided through mutual-aid group interventions that rely on social support received by and provided to the member's group, social reinforcement of abstinence, and especially, control of gambling-related stimuli (i.e., avoidance of situations and people who may trigger gambling behavior) (Blaszczynski, 1993; Hutchinson, Cox y Frings, 2018).

However, evidence regarding the effectiveness of mutual-aid treatments is scarce. A study involving 232 Gamblers Anonymous (GA) members found abstinence rates of 7.5% at the first-year follow-up (Stewart & Brown, 1988). Adherence to treatment was also rather low. Almost a quarter of new members did not attend a second meeting, and almost 75% of the participants attended less than 10 meetings. Furthermore, Petry (2005) found that abstinence in these groups was rather low. However, gamblers and family members who regularly attend this type of group apparently benefit from receiving support. In Spain, exploratory research has found positive results, including over 30% rehabilitation rates, 60–75% abstinence rates among completers, and less than 33% attrition (Jiménez-Murcia et al., 2014). Schuler et al. (2016) explored the current evidence for GA effectiveness regarding the treatment of pathological gambling. Results indicated that the evidence for the effectiveness of GA, either as a control condition or in conjunction

with formal treatment or medication, was inconclusive. For instance, Desai et al. (2012) found that GA as adjunctive treatment to pharmacological intervention did not result in significantly different gambling outcomes than other forms of treatment. Petry et al. (2006) showed that cognitive behavioural interventions alone and in conjunction with GA were more effective in improving gambling outcomes relative to GA referral alone. Finally, one study reported that imaginal desensitization plus motivational interviewing was superior to GA referral in reducing gambling behaviours (Grant et al., 2009).

The emphasis on patience, for instance, using the Serenity Prayer, and the absolute assertion of identity as a ‘‘compulsive gambler’’ were identified as important aspects of GA recovery culture. In this context, Schuler et al. (2016) identified the need for large-scale randomized controlled trials to determine GA effectiveness, as well as to research the mechanisms through which GA works. In fact, they found that most of studies focused on providing insight into GA practices and potential features of GA that may impact recovery. However, fewer studies evaluated the effectiveness of GA as a recovery approach for problematic gambling, analyzed the association between GA attendance and various outcome measures, or described characteristics of individuals attending GA. In general terms, these interventions presented a rather low effectiveness for managing craving-related factors and coping with automatic behaviors, thoughts, sensations and feelings associated with the gambling impulse.

As mentioned above, the common treatments for disordered gambling present some limitations due to either the lack of solid evidence concerning the effectiveness of mutual-aid groups like GA, or problems concerning the maintenance of therapeutic gains and relapse prevention, as occurs using CBT approaches. To some extent, these treatments do not provide disordered gamblers with tools to effectively manage craving-related factors or cope with the automatic behaviors, thoughts, sensations and feelings linked to the desire to gamble. As new approaches suggest, focusing on controlling and actively suppressing the urge to gamble is likely not an adequate strategy as control attempts may, paradoxically, fuel the desire as a side-effect (De Lisle, Dowling & Allen, 2014).

Mindfulness, automatic behavior and relapse prevention

In the context of paychological interventions, behavior therapy and cognitive therapy are described as first and second wave approaches, respectively. Mindfulness-based interventions represent a “third wave” that expands on the CBT tradition (Hayes, Follette, & Linehan, 2004). Although both traditional CBT and mindfulness-based psychotherapy emphasize decentering from thoughts (i.e., a thought does not equal reality), mindfulness-based psychotherapy has shifted from challenging the *content* of thoughts to changing one’s *relationship to* one’s thoughts and feelings (Sauer & Baer, 2009): the new relationship being a) non reactivity to inner experience, b) observing and attending to sensations,

perceptions, thougts, feelings, c) acting with awareness, no distraction, d) describing, labeling with words, and e) nonjudging of experience.

In CBT treatments, the challenging of the patient's thoughts is mainly focused on semantic or declarative meanings, without directly addressing functional aspects of such thoughts. Mindfulness-based psychotherapy overcomes this problem by intentionally bringing awareness to manifestations of processes that are commonly experienced in the form of body sensations, thoughts, and feelings. In this way, problem gamblers may acquire the skills to watch gambling-related cognitions come and go, irrespective of whether such cognitions arise in terms of thoughts, feelings, or body sensations, and then, respond to the observed thoughts with reduced conviction of their validity and reality (Toneatto, Vettese, & Nguyen, 2007).

As a consequence, although gambling-related thoughts may continue to occur, the duration, intensity, and salience of craving decrease, as the person neither reacts to the urge nor tries to increase control over unavoidable thoughts.

In a recent study, McIntosh, Crino & Neill (2016) compared the effectiveness of case formulation driven CBT, manualised CBT and mindfulness-based intervention to treat problematic gambling. All three interventions achieved significant improvements that were maintained at 3 and 6 months follow-up. The mindfulness and CBT interventions were more effective than manualized CBT treatments in reducing gambling behavior and associated stress, and also appeared to generalize to improvements in other measures, such as quality of life, mental functioning, and some facets of mindfulness. The authors concluded that a brief mindfulness intervention after psycho-education, and CBT intervention, may be a useful supplement to traditional CBT treatments, by addressing transdiagnostic processes such as rumination and thought suppression.

In this context, previous research has found tentative support for the use of mindfulness techniques for coping with craving associated with addictive behaviors, especially in combination with CBT (Maynard, Wilson, Labuzienski, & Whiting, 2018; McIntosh et al., 2016; Von Hammerstein et al., 2016, 2018). Mindfulness-based approaches aim to interrupt the automatic response to external and internal stimuli that trigger problem behavior through a process of increased awareness, acceptance of one's own feelings, sensations and thoughts, and development of nonjudgmental and nonreactive attitudes towards thoughts potentially eliciting gambling behavior (Levin & Hayes, 2012). For instance, according to this approach, being mindfully aware of craving and adopting a detached attitude towards one's desires are more adequate responses for reducing the likelihood of relapse than strategies focusing on the control of internal stimuli (i.e., suppressing craving-related thoughts and feelings).

An increasing body of research has analyzed the use of mindfulness-based techniques for the treatment of substance addictions and they have provided promising results (Black, 2012; Brewer et al., 2009; Chiesa & Serretti, 2014; Garland, Schwarz, Kelly, Whitt & Howard, 2012; Garland, Roberts-Lewis, Kelley,

Tronnier & Hanley, 2014; Himelstein, 2011; Katz & Toner, 2013; Leigh, Bowen & Marlatt, 2005; Marlatt et al. 2004; Zgierska, Rabago, Chawla, Kushner, Koehler & Marlatt, 2009). Interestingly, some studies have focused on the relationship between mindfulness practice and craving reduction, especially using Marlatt's "urge surfing" technique (Marlatt & Gordon, 1985). For instance, Bowen and Marlatt (2009) have suggested that mindfulness (i.e., "urge surfing") may not initially reduce the urges to smoke but may change the response to such urges. This meditation exercise encourages practitioners to observe cravings while maintaining openness and compassionate attitudes towards inner experiences (i.e., body sensations, thoughts, impulses, etc.). Building upon the metaphor of ocean waves, the rationale for this technique is that craving is an unstable temporary phenomenon. Similar to ocean waves, the urge could increase, decrease and eventually disappear if the person does not attempt to avoid or fight the craving (Bowen, Chawla & Marlatt, 2011). Therefore, surfing the urge aims to promote mindfully aware exposure to interoceptive sensations, thoughts, and feelings instead of the usual responses to avoid, suppress, control, or elude craving-related stimuli.

Shonin, Gordon, and Griffiths (2014) have suggested the following possible mechanisms that explain why mindfulness is useful in behavioral addiction problems: a) mindfulness involves a new relationship with the antecedents of problem behaviors, i.e., automatic responses are reduced, while awareness is increased (e.g., observing and labeling emotions and thoughts) and detached attitudes (e.g., curiosity, compassion, etc.) are promoted; b) addictive behaviors are replaced by the practice of mindfulness exercises, which reduces the risk of relapses; c) mindfulness changes the locus of control from external to internal, and the person progressively becomes more conscious of how their decisions affect the persistence of the addition problem; d) negative emotions usually associated with craving and relapses are replaced by compassion towards oneself and others; e) the value of addiction-related rewards decreases; f) life priorities and personal values are clarified; g) avoidant behavior patterns are replaced by exposure to craving-related stimuli (e.g., surfing the urge technique); h) physiological and psychological activation is reduced through conscious breathing; and i) tolerance to frustration is increased with a higher ability to delay rewards.

Previous research has also found that mindfulness techniques could be adequate for use among pathological gamblers (De Lisle et al., 2011, 2012, 2014; Lakeym, Campbell, Brown, & Goodie, 2007; Reid, Di Tirro & Fong, 2014; Toneatto et al., 2007). A recent meta-analysis concluded that research findings support the use of mindfulness-based interventions for the treatment of disordered gambling, although these results should be considered tentative (Maynard, et al. 2018). Peters, Erisman, Upton, Baer and Roemer (2011) have found that some facets of mindfulness are negatively correlated with some types of impulsivity, even after controlling for dispositional negative affect, which may suggest that a connection exists between mindfulness skills and the ability to refrain from

maladaptive impulsive behavior, such as gambling-related behavior, in the presence of negative mood states. Additional evidence is provided by research aiming to assess the effectiveness of mindfulness-based interventions for disordered gambling. Chen, Jindani, Perry and Turner (2014) carried out a preliminary study to determine whether an 8-week mindfulness-based intervention was suitable for problem gamblers. Although this study did not evaluate the possible effects of mindfulness training on relapse prevention, the participants reported being more in control, relaxed and able to stay in the present moment. A controlled pilot study using mindfulness-enhanced CBT also found positive results (Toneatto, Pillai, & Courtice, 2014). The severity of gambling, gambling-related urges and psychiatric symptoms were decreased among those participating in the mindfulness intervention compared with those among the participants on the control waitlist. Moreover, the therapeutic gains were maintained at the 3-month follow-up with positive outcomes associated with the practice of mindfulness. Similarly, recent research on Internet gaming disorder have used a Mindfulness-Oriented Recovery Enhacement program to examine changes in maladaptative gaming-related cognitions and positive reappraisal as mediators of the effects of this program (Li, Garland & Howard, 2018). Findings suggest that effects of mindfulness treatment in reducing maladaptive gaming-related cognitions might lead to reductions in Internet gaming disorder severity and cravings for video game playing. The effects of the program in reducing disorder severity and craving were mediated by changes in maladaptative gaming-related cognitions. Therefore, previous findings seem to suggest that the use of mindfulness techniques, as a supplement to CBT, may be effective for treating problematic gambling.

Drawing upon previous research showing the effectiveness of integrating mindfulness into treatments for problematic gambling, this study aims to evaluate the effectiveness of a mindfulness-based cognitive therapy (MBCT) group training to reduce gambling-related craving. First, we compare an MBCT intervention with a standard mutual-aid group intervention delivered in a pathological gamblers' association. We expected the MBCT treatment to yield larger reductions in craving-related variables than the mutual-aid group. As previously mentioned, strategies based on increasing awareness, acceptance and compassion (i.e., mindfulness-based exercises) could be a rational approach to enhancing coping with gambling-related impulses compared to using control-based approaches (i.e., standard self-help group interventions). Second, we analyze whether increases in mindfulness skills correspond to reductions in craving-related variables (intensity, frequency and urge of craving) over time. Third, the different facets of mindfulness are further analyzed to determine how mindfulness and craving could be related to each other.

Methods

Participants

The participants included 33 men with an average age of 41.91 years (*SD*=11.67) who attended a mutual-aid group at an important regional association of pathological gamblers. All participants had previously had problems with slot machines. On average, the participants had their first experience with slot machines at the age of 19.73 years (*SD*=6.17). However, 78.8% of the mutual-aid group members had no previous history of treatments for gambling-related problems, and 75.8% of the participants had not relapsed after quitting gambling. The participants had been abstinent for the prior 14.42 months (*SD*=12.71) on average prior to participating in this research. Only two persons presented comorbidity between pathological gambling and other disorders (anxiety and depression-related diagnoses). Tobacco consumption was widespread among the participants (78.8%), and 51.5% of the participants reported regularly drinking alcohol.

Most participants (90.9%) were self-defined as middle-class people, and most participants (75.8%) were employed, while 21.2% of the participants reported being unemployed or students, and only 3% of the participants were retired. The study sample included married (51.5%) and single (48.5%) men, and almost half of the participants had children (48.5%).

Procedures and design

Initially, 60 members of the disordered gamblers' association collaborating in this research were recruited. However, 27 members did not meet the inclusion criteria for participating in the mindfulness-based training program. The inclusion criteria were: a previous history of gambling problems related to slot machines, a score ≥5 on the NORC DSM-IV Screen for Gambling Problems (NODS) questionnaire (Gerstein *et al.*, 1999), attendance at the mutual-aid group program for at least one month, abstinence from gambling for 50 months maximum, attendance at the pathological gamblers' association accompanied by a significant supporting person (e.g., a relative, partner or friend), reported gambling-related craving in an ad hoc scale used to measure the craving intensity (score ≥2 on a craving intensity scale ranging from 0 to 10), and low levels of mindfulness skills (score ≤ 2.30 on the Five Facets of Mindfulness Questionnaire (FFMQ); Baer, Smith, Hopkins, Krietemeyer & Tonely, 2006). The study sample comprised 33 participants.

A repeated-measures design was used. The participants completed questionnaires on six different occasions. First, the pretreatment measures were obtained at time 1 (T1). Patients were given paper questionnaires, which they individually completed at home and returned to the researchers at the collaborating association. This first evaluation collected measures on: a) detection of people with a probable gambling-related problem (NORC Diagnostic Screen for Gambling

Disorders. Becoña, 2004); b) craving (an ad hoc questionnaire was used to measure the intensity, frequency and urgency of the craving, scoring these from 0 to 10); c) abstinence (a yes-no question was used to determine whether the participants abstained from gambling); and d) Mindfulness (FFMQ, Baer et al., 2006). Then, the participants were enrolled in an 8-week mutual-aid group program, which was the standard service provided by the pathological gamblers' association. Once the 8th session of the mutual-aid program was finished, the group members completed the questionnaires to evaluate craving, abstinence and mindfulness (Time 2, T2). The following week, the 8-week MBCT intervention was begun. Once the 8th session of the MBCT program was completed, the participants completed the questionnaires to evaluate craving, abstinence, mindfulness and practice of mindfulness and were asked to assess MBCT program-related aspects (frequence of practice, lenght of practice sessions, types of exercices performed, perceived usefulness of mindfulness exercices, satisfaction with te program and useful of mindfulness exercices for managing the urge to gamble) (Time 3, T3). Follow ups were scheduled for one month (time 4, T4), three months (time 5, T5), and six months (time 6, T6) after the mindfulness-based intervention. During the follow-ups, the subjects completed the same questionnaires as in Time T3. Measures T2 to T6 were completed in the same room where the intervention was usually provided.

Both the mutual-aid group intervention and the MBCT training were conducted by two expert health psychologists who were staff members of the association. The participants were informed in a previous session that they would be involved in an intervention program consisting of several stages. First, the participants would participate in the mutual-aid group usually provided by the association. Then, they would begin a psychological intervention program and finally, they would be encouraged to continue practicing some exercises after completing the psychological training. The participants did not receive any material compensation for attending the trainings, and all participants volunteered for this research. The confidential use of the measures, which were only collected for this study's purposes, was guaranteed by the research team. Informed consent was obtained from all participants.

To adequately provide the treatments to the 33 participants, four groups were randomly formed (three groups comprised 8 members, and one group comprised 9 members). Both the mutual-aid and MBCT interventions had a similar structure, including 8 weekly sessions of 2 hours each. The mutual-aid intervention basically focused on providing the participants with social support by means of maintaining positive interactions with the other gamblers attending the self-help group. In contrast, the MBCT intervention, based on Cormier (2012) and Bowen, Chawla and Marlatt (2011), mainly used the following five psychological techniques or practices: a) psychoeducation on pathological gambling; b) cognitive therapy techniques, such as identifying game-related cognitive distortions and cognitive reappraisal; c) formal (i.e., meditation training) and informal (i.e., daily life exercises) mindfulness exercises; d) imaginal exposure consisting of a

mindfulness-based exercise (i.e., "surfing the craving"). In vivo exposure with response prevention could not be used, as the disordered gamblers' association's norms do not allow this technique, and finally, e) relapse prevention. More detailed information regarding the MBCT program is presented in Table 1.

Table 1. Outline of the mindfulness-based cognitive therapy sessions.

Session	Contents	Techniques	After-session exercises
1	Presentation of the group. Goal setting. Introduction to mindfulness.	Ice-breaking activity. Mindfulness exercises (formal practice): Attentive breathing exercise and group awareness exercise.	Mindful breathing.
2	Explanation to participants about pathological gambling	Psychoeducation about pathological gambling: characteristics of gambling, phases of gambling addiction, stages of change in addictions, explanation of the recovery process. Mindfulness meditation: attentive breathing (formal practice).	Careful breathing
3	Deepening in mindfulness skills	Psychoeducation about mindfulness. Mindfulness exercises (formal and informal practice): mindfulness in daily life (raisin exercise), body-scan, surfing impulses and mountain meditation.	Body-scan or sitting meditation (6 days a week, 20-minute exercises) Pleasant event schedule
4	Deepening in mindfulness skills (continued). Using mindfulness to positively cope with stress and reduce the negative effects of reacting (without awareness) to stressful situations. Discussing how stress-related responses work.	Mindfulness exercises (formal and informal practice): auditory and visual meditation, yoga, walking meditation, surfing impulses and mountain meditation.	Walking meditation. Refreshing mindfulness exercises previously trained
5	Identifying irrational beliefs about gambling and cognitive distortions that trigger stress responses and negative emotions.	Psychoeducation on cognitive therapy and pathological gambling: explanation of the gambling cycle. Cognitive restructuring: identifying gambling-related cognitive distortions and cognitive reappraisal Mindfulness exercises (formal and informal practice): meditation of the mountain. Surfing the impulses (imaginal exposure)	Sitting and walking meditation. Recording and restructuring distorted thoughts about gambling.

Session	Contents	Techniques	After-session exercises
6	Recognizing thoughts as thoughts. Relapse prevention.	Mindfulness exercises (formal and informal practice): Mindfulness meditation focusing on thoughts, SOBER breathing technique (Stop-Observe-Breath-Expand awareness-Respond mindfully). Psychoeducation: the cycle of relapses. Surfing the impulses (imaginal exposure), Mindfulness exercises: thoughts related to relapse (formal practice):	20 minutes of any mindfulness exercise learned in the program. SOBER breathing technique .
7	Relapse prevention for pathological gambling	Relapse prevention: Identification of alarm signals in a relapse and creation of an action plan. Mindfulness exercises (informal practice): conscious walking and SOBER technique to breath in difficult situations.	Refreshing mindfulness exercises previously trained (formal practice). SOBER breathing technique.
8	Ending: Reviewing techniques learned and encouraging the participants to continue performing mindfulness practice in daily life.	Group discussion focusing on issues related to the practice of mindfulness in daily life.	Practicing mindfulness in daily life

Instruments

Screening for gambling-related problems. The Spanish adaptation of the NORC Diagnostic Screen for Gambling Disorders was used to detect persons with a probable gambling-related problem (Becoña, 2004; Gernstein *et al.* 1999). This instrument consists of 17 yes-no questions (e.g., 'Have you ever gambled as a way to escape from personal problems?') with total scores ranging from 0 to 10. A score of 5 or higher suggests that the respondent's results are consistent with a likely diagnosis of pathological gambling according to the diagnostic criteria of the DSM-IV. Previous research has found the NORC Diagnostic Screen for Gambling Disorder is a valid, reliable and clinically useful measure of gambling problems (Wickwire, Burke, Brown, Parker, & May, 2008).

Craving. Three ad hoc items were used to measure craving intensity ("Over the past seven days, how strong was your desire to gamble?"), frequency ("Over the past seven days, how often did you feel the craving to gamble?") and urgency ("Over the past seven days, how urgent was your craving to gamble?").

The participants rated the strength of their desire to gamble on a scale ranging from 0 to 10, with 0 representing no desire and 10 representing a highly intense craving. The frequency of their craving was rated using a similar response format, with 0 indicating that the respondent never felt the desire to gamble and 10 indicating that the respondent often had an extreme craving to gamble. Finally, the urge of craving was rated from 0, indicating no urgency, to 10, indicating extreme urgency. Single-item rating scales have been identified as a usual method for assessing craving (Ashrafioun & Rosenberg, 2012). However, a total craving score was also calculated by averaging the participants' responses to the three items. The intensity, frequency and urgency-related questions were considered items of a single craving scale, which demonstrated a high internal consistency with alphas ranging from 0.79 to 0.91 across the times of measurement.

Abstinence. A yes-no question, i.e., 'Over the past eight weeks, did you play slot machines or any other game of chance risking money or material goods?', was used to determine whether the participants abstained from gambling

Mindfulness. The participants' mindfulness-related skills were assessed using the Spanish version of the Five Facets of Mindfulness Questionnaire (FFMQ) (Baer et al. , 2006; Cebolla, García-Palacios, Soler, Guillen, Baños and Botella, 2012). This 39-item instrument was designed to evaluate the respondents' general tendency to be mindful in daily life. The FFMQ assumes a multidimensional view of mindfulness and includes items related to the actual ability of the respondents to observe their own thoughts, bodily sensations and emotions, describe their feelings, act with awareness, and approach inner experiences in a nonjudgmental and nonreactive way. Item examples include 'When I'm walking, I deliberately notice the sensations of my body moving' (Observing); 'I'm good at finding words to describe my feelings' (Describing); 'When I do things, my mind wanders off and I'm easily distracted' (reversed, Acting with awareness); 'I criticize myself for having irrational or inappropriate emotions' (reversed, Nonjudgmental attitude); and 'When I have distressing thoughts or images, I just notice them and let them go' (Nonreactivity). The participants rated how frequently they engage in the presented behaviors on a 5-point Likert-type scale, where 1=Never or very rarely true and 5=Very often or always true. The FFMQ allows for the calculation of separate scores corresponding to the five dimensions of mindfulness. In addition, a unique global scale score was calculated by averaging the respondents' answers to the 39 items. Higher scores (range 1-5) are indicative of a higher tendency to be mindful in daily life. The internal consistency reliability ranged from α=0.81 to α=0.87 (total FFMQ); α=0.70 to α=0.74 (Observing); α=0.87 to α=0.93 (Describing); α=0.68 to α=0.72 (Acting with awareness); α=0.80 and α=0.88 (Nonjudging); and α=0.54 and α=0.68 (Nonreactivity). Surprisingly, a Cronbach's alpha value below 0.50 was obtained for the "Observing" facet at T4.

Practice of mindfulness and participants' assessment of the MBCT program. After the MBCT training, at the one-month, three-month and six-month follow ups, the participants completed a short questionnaire about their practice of mindfulness exercises in daily life. This questionnaire aimed to measure the participants' engagement with meditation-related practices. In particular, the participants were asked about their frequency of practice, length of practice sessions, types of exercises performed (i.e., mindful-yoga, walking meditation, S.O.B.E.R. technique, etc.), and perceived usefulness of the mindfulness exercises for coping with craving and managing disturbing thoughts, sensations, and emotions. The participants were also asked to rate their satisfaction with the MBCT program using a scale ranging from 0 to 10 with 10 indicating high satisfaction. The participants also indicated whether the mindfulness exercises were useful for managing the urge to gamble (yes/no question).

Data analyses

The descriptive statistics (means and standard deviations) of the study variables were calculated. A repeated-measures ANOVA, with the time of measurement from T1 to T6 as the within-subjects factor, was used to analyze the changes in craving (total score, intensity, frequency and urge) and mindfulness (total score and each of the five facets of mindfulness). Because the sphericity assumption for repeated-measures ANOVA was not met in any case, the robust Greenhouse-Geisser *F* is reported. Pairwise comparisons were conducted using Bonferroni correction. Therefore, the significance level was set at .05/15=.003 for paired contrasts. Eta-squared (η^2) was calculated as a measure of the effect-size, indicating the amount of variance in mindfulness and the craving-related variables explained by the factors (i.e., the different time measures being compared).

All analyses were conducted using the statistical software package SPSS 20 (IBM, Armonk, USA).

Results

Overall, the participants initially presented moderate levels of craving and low levels of mindfulness at T1 (Table 2). After the mutual-aid group intervention, the participants' total craving scores did not significantly change, as indicated by *post hoc* tests using a Bonferroni correction. Concerning the craving-related items, the mutual-aid group intervention only produced significant changes in the craving intensity scores at T2, $F_{1,32}=11.81$, $p=.002$. However, no significant changes were observed in the frequency and urgency of cravings. Two participants reported that they were unable to abstain from gambling from T1 to T2.

Concerning mindfulness, the participants exhibited slightly increased total scores from T1 to T2, which represented statistically significant gains, $F(1,32)=23.74$, $p=.000$. After attending the mutual-aid program, the participants' intensity of craving and total mindfulness scores were moderately improved.

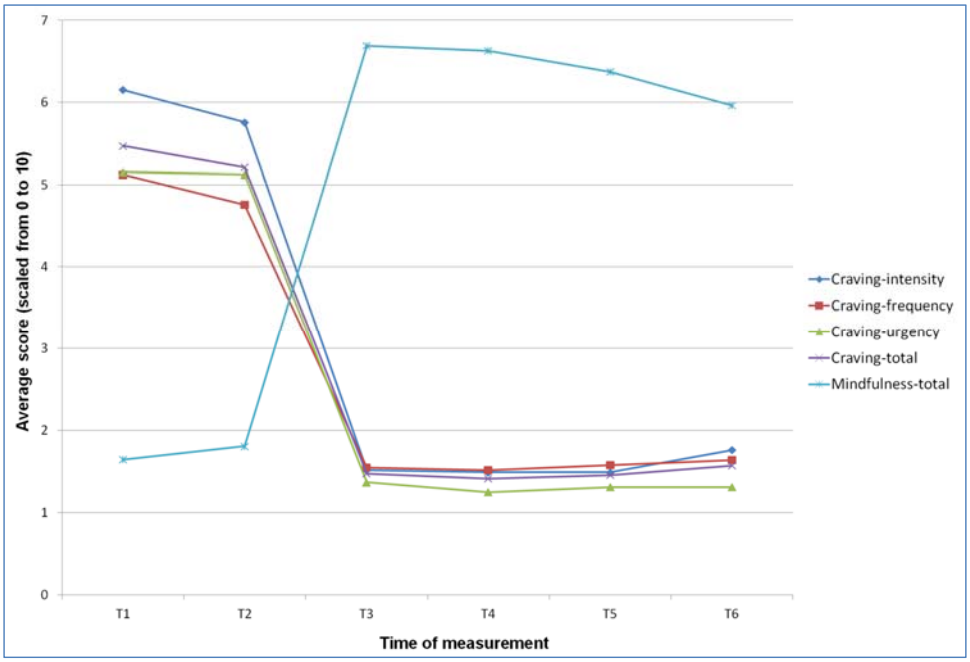
Table 2. Descriptive statistics (means and standard deviations in parentheses) of mindfulness and craving-related variables based on a repeated-measures ANOVA comparing T1 to T6.

	T1	T2	T3	T4	T5	T6	ANOVA *F*
Craving							
Intensity	6.15 (1.46)	5.76 (1.17)	1.51 (0.57)	1.48 (0.51)	1.48 (0.51)	1.76 (0.61)	$F_{1.76,56.38}=348.55$
Frequency	5.12 (1.60)	4.46 (1.09)	1.55 (0.62)	1.51 (0.57)	1.58 (0.66)	1.64 (0.70)	$F_{1.92,61.53}=164.10$
Urgency	5.15 (1.86)	5.12 (1.36)	1.36 (0.55)	1.24 (0.43)	1.30 (0.47)	1.30 (0.47)	$F_{1.62,51.91}=194.01$
Total	5.47 (1.38)	5.21 (1.03)	1.47 (0.53)	1.41 (0.46)	1.45 (0.51)	1.57 (0.51)	$F_{1.76,56.29}=335.93$
Mindfulness							
Observing	1.19 (0.25)	1.21 (0.24)	3.84 (0.19)	3.76 (0.19)	3.47 (0.24)	3.15 (0.26)	$F_{2.58,82.59}=1301.18$
Describing	1.89 (0.77)	2.06 (0.63)	3.09 (0.59)	3.09 (0.58)	3.09 (0.58)	3.04 (0.53)	$F_{1.83,58.43}=57.79$
Awareness	1.17 (0.21)	1.23 (0.28)	3.71 (0.29)	3.68 (0.26)	3.53 (0.24)	3.22 (0.26)	$F_{2.49,79.54}=877.91$
Nonreactivity	1.51 (0.35)	1.55 (0.35)	3.63 (0.28)	3.63 (0.29)	3.58 (0.25)	3.51 (0.25)	$F_{2.38,76.12}=837.52$
Nonjudging	2.46 (0.66)	2.59 (0.61)	4.10 (0.28)	4.09 (0.28)	4.09 (0.28)	4.01 (0.28)	$F_{1.71,54.72}=184.72$
Total	1.66 (0.25)	1.72 (0.24)	3.68 (0.24)	3.65 (0.23)	3.55 (0.20)	3.38 (0.19)	$F_{1.99,63.73}=1194.11$

Notes. T1: initial measurement prior to any intervention; T2: measurement after the mutual-aid group intervention but before the MBCT intervention; T3: measurement after the MBCT intervention; T4: one-month follow-up; T5: three-month follow-up; T6: six-month follow-up. Greenhouse-Geisser F is reported. All ANOVA F values are significant at p=.00.

The differences between T1 and T2, i.e., pre- and postmeasures corresponding to the self-help group intervention, accounted for 27% and 43% of the variance in the craving intensity and mindfulness total scores, respectively (Table 3). In comparison, only 16% of the variance in the craving total scores and 17% of the variance in the frequency of craving were explained by the differences between T1 and T2, whereas the changes in the craving urgency were not significant.

Great increases in the mindfulness total scores ($F_{1,32}$=4286.43, p=.000) were observed from T2 to T3, paralleling the strong reductions in the craving total ($F_{1,32}$=693.16, p=.000), intensity ($F_{1,32}$=677.32, p=.000), frequency ($F_{1,32}$=427.02, p=.000) and urgency ($F_{1,32}$=323.70, p=.000) scores. These time measures corresponded to the beginning and ending of the MBCT intervention, which presumably had a strong effect on the participants' levels of both craving and mindfulness (Figure 1).



Notes: To provide a clearer comparison between mindfulness and craving, the mindfulness scores were rescaled to 0-10 points. T1: initial measurement prior to any intervention; T2: measurement after the mutual-aid group intervention but before the MBCT intervention; T3: measurement after the MBCT intervention; T4: one-month follow-up; T5: three-month follow-up; T6: six-month follow-up.

Figure 1. Mindfulness (total) and craving-related variables from T1 to T6.

Furthermore, the eta-squared measures of the effect sizes indicated that the time of measurement, i.e., pre- and post-MBCT intervention, accounted for more than 90% of the variance in the mindfulness total scores, craving total scores, and craving intensity, frequency and urgency (Table 3). All participants abstained from gambling during the MBCT training with no relapses at the follow ups.

Interestingly, the mindfulness total scores and craving scores (total, intensity, frequency and urgency) remained stable at T4, and no statistically significant differences were observed between T3 and T4. Thus, the participants

continued to report moderately high levels of mindfulness and low levels of craving one month after the MBCT intervention. Moreover, the pairwise comparisons indicated that the participants' assessments of their craving intensity, frequency and urgency remained stable at low levels from T4 to T6. However, the mindfulness total scores slightly decreased after T4. The pairwise comparisons between T4 and T5 ($F_{1,32}$=25.18, p=.000) and T4 and T6 ($F_{1,32}$=21.74, p=.000) yielded significant results. On average, the participants reported moderately high levels of mindfulness 3 months and 6 months after completing the MBCT training.

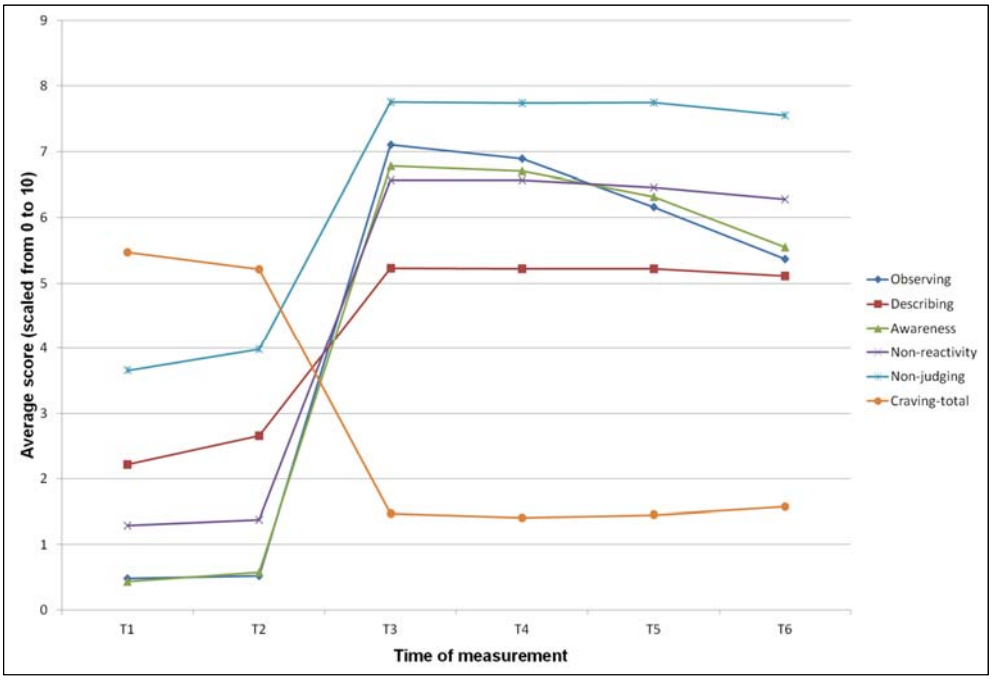
Table 3. Eta-squared (η^2) effect-size in the comparisons of consecutive time periods.

	T1 vs. T2	T2 vs. T3	T3 vs. T4	T4 vs. T5	T5 vs. T6
Craving					
Intensity	0.270	0.955	0.030	0.000	0.098
Frequency	0.168	0.930	0.030	0.020	0.003
Urgency	0.001	0.910	0.121	0.020	0.000
Total	0.163	0.956	0.182	0.027	0.020
Mindfulness					
Observing	0.035	0.987	0.306	0.778	0.463
Describing	0.217	0.840	0.001	0.000	0.002
Awareness	0.093	0.973	0.039	0.366	0.481
Nonreactivity	0.121	0.982	0.000	0.049	0.042
Nonjudging	0.179	0.914	0.004	0.001	0.032
Total	0.426	0.993	0.053	0.440	0.225

Notes: T1: initial measurement prior to any intervention; T2: measurement after the mutual-aid group intervention but before the MBCT intervention; T3: measurement after the MBCT intervention; T4: one-month follow-up; T5: three-month follow-up; T6: six-month follow-up.

A more detailed analysis of the participants' scores on each of the five mindfulness facets revealed no significant changes in any particular facet of mindfulness from T1 to T2. In fact, the mutual-aid group intervention produced only small-sized changes in 'observing' and 'awareness', i.e., 3% and 9% of their respective variances were explained by the time of the measurement (T1 vs. T2), while moderate changes (12%-22% of the variance explained by the time

differences) were observed in 'describing', 'nonreacting' and 'nonjudging' (Table 3). In contrast, strong changes were observed from T2 to T3 in each of the five facets of mindfulness (Figure 2).



Notes. To provide a clearer comparison between mindfulness and craving, the mindfulness scores were rescaled to 0-10 points. T1: initial measurement prior to any intervention; T2: measurement after the mutual-aid group intervention but before the MBCT intervention; T3: measurement after the MBCT intervention; T4: one-month follow-up; T5: three-month follow-up; T6: six-month follow-up

Figure 2. Five facets of mindfulness and craving (total) variables from T1 to T6.

As presented in Table 2, the participants reported great increases in 'observing' ($F_{1,32}$=2415.88, p=.000), 'describing' ($F_{1,32}$=167.60, p=.000), 'acting with awareness' ($F_{1,32}$=1161.29, p=.000), 'nonreacting' ($F_{1,32}$=1770,60, p=.000), and 'nonjudging' ($F_{1,32}$=340.99, p=.000). The differences between pre- and post-MBCT intervention accounted for 84% of the variance in 'describing' and over 91% of the variance in 'nonjudging', 'nonreacting', 'awareness', and 'observing' (Table 3).

The changes observed after the MBCT intervention in the 'describing', 'nonreacting' and 'nonjudging' facets of mindfulness were quite stable (Figure 2). No significant changes were observed in these facet scores after T3, presenting moderately high values on average. However, the other two facets of mindfulness,

i.e., 'observing' and 'acting with awareness', presented slightly decreasing values after T3 and T4, respectively. Furthermore, the 'observing' scores progressively decreased with significant changes in the T3 vs. T4 ($F_{1,32}$=14.08, p=.001), T4 vs. T5 ($F_{1,32}$=112.00, p=.000), and T5 vs. T6 ($F_{1,32}$=27.57, p=.000) pairwise comparisons. Concerning 'acting with awareness', the gains were maintained one month after the MBCT intervention. However, the T4 vs. T5 ($F_{1,32}$=18.51, p=.000) and T5 vs. T6 ($F_{1,32}$=29.70, p=.000) pairwise comparisons indicated progressively decreasing scores at the 3- and 6-month follow ups. Both the 'observing' and 'awareness' facets presented moderately high values from T3 to T6.

Remarkably, all participants reported practicing mindfulness exercises after the MBCT training at the one-month and three-month follow ups. At T4 and T5, most trainees (96.97%) reported that they had engaged in mindfulness exercises at least three days a week in mostly 15-30 minutes sessions (81.8% and 90.9% of the participants at T4 and T5, respectively). At the six-month follow-up, 84.85% of the participants continued engaging in mindfulness-related practices. However, the frequency and length of the practice were decreased; only 42.42% of the participants reported that they engaged in mindfulness exercises on a weekly basis, and most trainees (57.57%) engaged in sessions lasting less than 15 minutes.

The participants' average satisfaction with the MBCT intervention was 9.33 (SD=0.64), and all participants stated that the mindfulness training was helpful for coping with cravings.

Discussion

Our study analyzed the effectiveness of two approaches, a mutual-aid group intervention and an MBCT training, in the treatment of disordered gambling. The results showed that both interventions produced changes in the participants' craving-related variables. However, attendance at the mutual-aid group only affected the intensity of craving with small magnitude changes. In comparison, the MBCT intervention performed very well in reducing all craving-related scores, i.e., total craving, intensity, frequency, and urgency. Moreover, large magnitude changes were observed from pre- to post-MBCT training. Therefore, the MBCT intervention was superior to the mutual-aid group intervention.

These results are consistent with previous research assessing the effectiveness of mindfulness interventions aiming to reduce substance-related craving (Bowen & Marlatt, 2009; Chiesa & Serretti, 2014; Li, McGovern, O´Brien, Tronnier & Howard, 2017; Marlatt et al., 2004; Maynard et al., 2018; Rogojanski et al., 2011; Witkiewitz et al., 2013). The rationale underlying our intervention is based on the role of impulsiveness and automatic responses to gambling-related stimuli in pathological gambling. As mentioned, research has linked craving to low levels of awareness and inadequate impulse control among gamblers (Reid, Di Tirro & Fong, 2014). Similarly, Peters et al. (2011) suggested that mindfulness

skills may prevent a person from engaging in impulsively driven maladaptive behaviors, even if negative emotions (e.g., blame or anxiety) are present.

Our results showed that the MBCT training significantly increased the mean mindfulness levels among the participants, and large effect-size changes were observed across all the mindfulness facets (i.e., observing, describing, acting with awareness, nonjudgmental attitude, and nonreactivity). Parallel changes in mindfulness and craving-related variables were also observed after the MBCT treatment and at the follow ups. This finding is consistent with a recent meta-analysis conducted by Maynard et al. (2018), who found that mindfulness-based interventions yielded moderate to large effects on gambling behaviors/symptoms and gambling urges. Moreover, the participants experienced no relapses during and after the mindfulness training. As expected, these relationships suggest that coping with one's impulses is crucial in managing gambling-related problems. However, mindfulness-based approaches do not attempt to "control the urge"; in contrast, the participants are trained to "surf the craving". This shift in approach could likely explain the different outcomes of the mutual-aid and MBCT interventions. In contrast to the standard treatment provided by the disordered gamblers' association, the MBCT program trains participants to be aware of craving-related thoughts, sensations and feelings and contemplate them with a compassionate (i.e., nonjudgmental) and nonreactive attitude, which may ultimately work as exposure therapy to potentially stressful stimuli.

The persistence of the therapeutic gains over time may dependent on the practice of mindfulness exercises. In this regard, our study participants engaged in mindfulness practice to a great extent, and over 84% of the participants continued to practice at the follow ups. In comparison, previous studies have found lower percentages of adherence (Toneatto *et al*., 2014).

The participants reported overall high levels of mindfulness and low levels of craving after the MBCT intervention, and these results were rather stable across the follow-up period. The dimensions of mindfulness that persist most durably over 6 months are those of describing, not reacting and not judging. Thus, it could be interpreted that the continuous practice of the exercises trained in the program facilitates: a) maintaining the capacity to describe or label with words the experience, the contents observed, the emotions, feelings, moods, sensory and sensitive stimuli; b) maintaining the capacity of non-judging the internal experience. Here, thougths, sensations and emotions are observed as temporary objects that arise in the perceptive field, without identifying, attaching or rejecting them. Instead, the mindfulness practitioners are encouraged to describing them impartially, objectively, "taking distance" and without reacting, and, finally, it facilitates c) maintaining the capacity of non-reactivity to internal experience. This is a process of distancing oneself from what is happening in the attentional field, and emphasizes a period of time in which one does not act or react to the stimulus. This allows for a valued response rather than an automatic reaction to the stimulus.

However, observing and acting with awareness decreased significantly throughout the follow-ups, a finding that has been also reported by previous research (De Lisle et al., 2011). This finding suggest that these dimensions of mindfulness are not related to the the decrease in craving across time. Observing implies being open and perceptive to recognize stimuli that are not normally the main object of attention and remain outside the main action, as they are common stimuli in everyday life. Acting with awareness implies acting with consciousness when performing acts in which one is concentrated, or becoming aware of specific aspects of the action. Both, observing and acting with awareness entail paying attention to usually unnoticed stimuli. Seemingly, paying more attention to common, everyday stimuli that we don't usually notice, as well as being focused on what we are doing, without mentally wandering off at the time, are not dimensions of the mindfulness training essential to decrease the gambling-related craving. Observing and acting with awareness, may be a paradoxical "anxiolytic". Actually, focusing attentively on other daily stimuli or trying to anchor oneself attentively to the activities being performed, could play a role of escape/avoidance from craving, which, through negative reinforcement, can contribute to maintaining it over time. On the contrary, describing, not reacting and not judging are dimension that encourage exposure to interoceptive cues associated with craving.

Segal, Williams & Teasdale (2002) recommend a regular, daily mindfulness meditation of 40 min, with a regular, daily, brief practice preferable to a longer infrequent practice. In our case, although the training pattern was high during the follow-ups at months 1 and 3, at the 6 months follow-up, half of the subjects practiced less than 15 minutes per week. It is common in these areas that people eventually use specific mindfulness strategies (ie. SOBER technique) only when they are in situations of gambling related urges or craving. Carmody and Baer (2008) found that home practice of the formal meditation exercises was significantly correlated with the degree of change in facets of mindfulness. Baer et al. (2008) also found that meditation experience was significantly and positively correlated with all of the mindfulness facets, with the exception of acting with awareness.

As noted, scores on the describe, nonreactivity and nonjudging dimensions are maintained over 6 months despite the decline in training. Baer et. al (2006) considered these facets to be negatively related to thought suppression and experiential avoidance as both these variables involve judgmental attitudes toward thoughts and feelings. Some research on meditational mechanisms shows that thought suppression has been found to partially mediate the relationship between mindfulness and other addictive disorders such alcohol abuse (Bowen, Witkiewitz, Dillworth, & Marlatt, 2007). In this sense, MBCT may alter avoidant styles of cognitive processing and emotion dysregulation implicated in problematic gambling (Di Dio & Ong, 1997; Williams, Teasdale, Segal, & Soulsby, 2000; De Lisle et al., 2011).

The satisfaction with the MBCT program was very high among the participants, and all participants assessed the intervention as useful. This result is consistent with those of Chen et al. (2014) and De Lisle et al. (2012), who found that mindfulness-based interventions were greatly accepted among pathological gambling patients.

However, the findings presented here must be interpreted cautiously due to the limitations of this study. First, a convenience sample of participants volunteering for the interventions provided was used, which may entail a motivational bias. In addition, gender-related aspects could not be analyzed, as our sample comprised only men, which may limit the extrapolation of the results. Second, this study relies on self-report measures, which may be affected by social desirability and memory biases. Third, neither the participants nor the psychologists conducting the interventions were blinded to the treatments' purposes, and therefore, their expectations may have played a role in the treatment outcomes. Fourth, our repeated-measures design had no control group, and therefore, possibly confounding time effects could not have been adequately controlled.

The limitations of this study are mainly related to the lack of randomization of subjects to the two treatments, the lack of a control group without treatment (e.g. waiting list), or as another possibility, the comparison with another cognitive behavioral treatment well established to treat this problem. These points should be taken into consideration in future works.

Although the use of randomization and control group would be optimal conditions to carry out the study, in this study the design aimed to reconcile research objectives with the possibilities of carrying out a study in a field situation, in the context of the collaborating association. This implied tacit acceptance of certain limitations and restrictions, probably the most significant of which was that the high demand for care in the partner association. Keeping patients on the waiting list for 8 weeks was not advisable. On the other hand, until the implementation of the MBCT program, gamblers were not receiving any evidence-based psychological intervention. Therefore, the only possible comparison was the mutual-aid group treatment usually provided in this type of association. The limitations in the study design must also be considered in the light of the possible advantages of intra-subject designs. This type of study has a high ecological validity. It also has a high applicability in therapeutic contexts where psychological care is usually developed. Their longitudinal character allows each subject to act as his or her own control (Ellis, 1999). However, the design does not allow for the isolation of all possible extraneous variables, such as those due to time effects or, as in the present study, the possibility of additive effects following the previous group-aid intervention.

As to time effects, the reduction in craving and other adiction-related cognitions and behaviors as well as the improvement in mindfulness skills could be attributed to an incremental effect of the mutual-aid group intervention combined

with MBCT training, rather than to the MBCT training itself. Given that the craving intensity dropped and mindfulness scores increased after the mutual-aid intervention, it is difficult to argue that the beneficial effect of the intervention is only due to the MBCT training, without considering the additive effect of the mutual-aid intervention. Although the percentage of variance explained by the MBCT intervention is much higher than that explained by the mutual-aid treatment craving decrease and mindfulness increase in both, the additive effect cannot be ruled out.

Despite these limitations, our main results are consistent with previous research. Moreover, using a repeated-measures design allowed for controlling potential within-subject confounding variables as both treatments (i.e., mutual-aid group and MBCT training) were provided to each participant. Finally, the longitudinal design, which included six measurements, confirmed the stability of the patterns observed over time.

In addition, results are very consistent with the usual exposure practice carried out in pathological gambling CBT programs. In fact, it could be that the active elements entailed by the mindfulness training may be developing the ability to accurately identify emotions when gambling desire arises, perceiving craving as something transitory, without fusing oneself with the seemingly urgent impulses, thoughts, and sensations, and finally, not reacting immediately to that internal experience. This behaviour allows that a response option can be chosen after evaluating other available alternatives. Taken as a whole, this process implies an exposure to problematic emotions, sensations and thoughts with an attitude of acceptance, as well as differently to the usual dynamics of escape and avoidance that contributes to the maintenance of the problem. Contrarily, exposure and response prevention behaviours implicit in mindfulness could facilitate habituation to emotions processes (De Lisle et al., 2014).

Given this, the usual treatments for gambling-related problems could benefit from mindfulness-based techniques. The integration of evidence-based CBT and mindfulness approaches has emerged as a promising treatment strategy for impulse-control and addiction problems, such as pathological gambling (Toneatto et al., 2014). Increasing disordered gamblers' awareness may counteract impulsivity and transform avoidant, controlling, or suppressive responses into exposure to inner experiences and gentle acceptance of thoughts, sensations and emotions, which has been demonstrated to be an adequate strategy for coping with craving.

References

Ashrafioun, L., & Rosenberg, H. (2012). Methods of assessing craving to gamble: A narrative review. *Psychology of Addictive Behaviors, 26*(3), 536-549. doi: 10.1037/a0026367

Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment*, *13*(1), 27-45. doi: 10.1177/1073191105283504

Becoña, E. (2004). Prevalencia del juego patológico en Galicia mediante el NODS. ¿Descenso de la prevalencia o mejor evaluación del trastorno? *Adicciones, 16*, 173-184.

Black, D.S. (2012). Mindfulness and substance use intervention. *Substance Use & Misuse, 47*, 199–201. doi: 10.3109/10826084.2011.635461

Blaszczynski, A. (1993). Juego patológico: una revisión de los tratamientos. *Psicología Conductual, 1*(3), 409-440.

Bowen, S., & Marlatt, A. (2009). Surfing the urge: brief mindfulness-based intervention for college student smokers. *Psychology of Addictive Behaviors*, *23*(4), 666-671. doi: 10.1037/a0017127

Bowen, S., Chawla, N., & Marlatt, G.A. (2011). *Mindfulness-based Relapse Prevention for Addictive Behaviors. A clinican's guide.* Nueva York, USA: The Guilford Press.

Bowen, S., Witkiewitz, K., Dillworth, T. M., & Marlatt, G. A. (2007). The role of thought suppression in the relationship between mindfulness meditation and alcohol use. *Addictive Behaviors, 32*, 2324-2328. doi:10.1016/j.addbeh.2007.01.025

Brewer, J.A., Sinha, R., Chen, J.A., Michalsen, R.N., Babuscio, T.A., Nich, C. et al. (2009). Mindfulness training and stress reactivity in substance abuse: results from a randomized, controlled stage I pilot study. *Journal of Substance Abuse Treatment, 30*(4), 306-17. doi: 10.1080/08897070903250241

Carmody, J., & Baer, R. A. (2008). Relationships between mindfulness practice and levels of mindfulness, medical and psychological symptoms and well-being in a mindfulness-based stress reduction program. *Journal of Behavioral Medicine, 31*, 23-33. doi:10.1007/s10865-007-9130-7

Cebolla, A., García-Palacios, A., Soler, J., Guillen, V., Baños, R., & Botella, C. (2012). Psychometric properties of the Spanish validation of the Five Facets of Mindfulness Questionnaire (FFMQ). *European Journal of Psychiatry, 26*(2)118-126. doi: 10.4321/S0213-61632012000200005

Chen, P., Jindani, F., Perry, J., & Turner, N.L. (2014). Mindfulness and problem gambling treatment. *Asian Journal of Gambling Issues and Public Health, 4*(2), 1-17. doi: 10.1186/2195-3007-4-2

Chiesa, A., & Serretti, A. (2014). Are Mindfulness-Based Interventions Effective for Substance Use Disorders? A Systematic Review of the Evidence. *Substance Use & Misuse, 49*(5), 492-512. doi: 10.3109/10826084.2013.770027

Chrétien, M., Giroux, I., Goulet, A., Jacques, C., & Bouchard, S. (2017). Cognitive restructuring of gambling-related thoughts: A systematic review. *Addictive Behaviors*, *75*, 108-121. doi: 10.1016/j.addbeh.2017.07.001

Comings, D. E., Gade-Andavolu, R., Gonzalez, N., Wu, S., Muhleman, D., Chen, C., et al. (2001). The additive effect of neurotransmitter genes in pathological gambling. *Clinical Genetics,60*(2), 107–116.

Cormier, A. (2012). *A mindfulness-based cognitive psychoeducational group manual for problem gambling: Freedom from the gambling fog* (Unpublished master's project). Lethbridge, AB: University of Lethbridge.

Desai, N., Rofman, E., King, K., O'Connor, A., Krebs, C., Potenza, M., et al. (2012). Bupropion SR and harm reduction vs. abstinence-focused treatment for problem gambling. *American Journal on Addictions, 21*(4), 383–384.

De Lisle, S.M., Dowling, N.A., & Allen, J.S. (2011). Mindfulness-Based Cognitive Therapy for Problem Gambling. *Clinical Case Studies, 10*(3), 210-228. doi: 10.1177/1534650111401016

De Lisle, S.M., Dowling, N.A. & Allen, J.S. (2012) Mindfulness and Problem Gambling: A Review of the Literature. *Journal of Gambling Studies, 28***,** 719–739. doi:10.1007/s10899-011-9284-7

De Lisle, S., Dowling, N.A. & Allen, J.S. (2014). Mechanisms of Action in the Relationship between Mindfulness and Problem Gambling Behaviour. *International Journal of Mental Health and Addiction*, *12***,** 206–225. doi:10.1007/s11469-014-9475-4

Di Dio, K., & Ong, B. (1997). The conceptual link between avoidant coping style, stress and problem gambling. In G. Coman, B. Evans, & R. Wooton (Eds.), *Proceedings of the 8th National Association for Gambling Studies Conference: Responsible gambling: A future winner* (pp. 91-100). Adelaide, Australia: National Association for Gambling Studies.

Echeburua, E., Fernandez-Montalvo, J., & Baez, C. (2001). Predictors of therapeutic failure in slot-machine pathological gamblers following behavioural treatment. *Behavioural and Cognitive Psychotherapy,29*, 379–383. doi: 10.1017/S1352465801003113

Echeburúa, E., Salaberría, K., & Cruz-Sáez, M. (2014). Nuevos retos en el tratamiento del juego patológico. *Terapia Psicológica, 32*(1), 31-40. doi: 10.4067/S0718-48082014 000100003

Garland, E.L., Roberts-Lewis, A., Kelley, K., Tronnier, C., & Hanley, A. (2014). Cognitive and affective mechanisms linking trait mindfulness to craving among individuals in addiction recovery. *Substance Use & Misuse, 49*(5), 525-535. doi: 10.3109/10826084. 2014.850309

Garland, E.L., Schwarz, N.R., Kelly, A., Whitt, A., & Howard, M.O. (2012). Mindfulness-Oriented Recovery Enhancement for Alcohol Dependence: Therapeutic Mechanisms and Intervention Acceptability. *Journal of Social Work Practice in the Addictions, 12*(3), 242-263. doi: 10.1080/1533256X.2012.702638

Gerstein, D., Volberg, R. A., Toce, M. T., Harwood, H., Johnson, R. A., Buie, T., et al. (1999). *Gambling impact and behavior study: Report to the national gambling impact study commission*. Chicago: National Opinion Research Center.

Gooding, P., & Tarrier, N. (2009). A systematic review and meta-analysis of cognitive-behavioural interventions to reduce problem gambling: hedging our bets?. *Behaviour Research and Therapy*, *47*(7), 592-607. doi: 10.1016/j.brat.2009.04.002

Grant, J. E., Donahue, C. B., Odlaug, B. L., Kim, S. W., Miller, M. J., & Petry, N. M. (2009). Imaginal desensitisation plus motivational interviewing for pathological gambling: randomised controlled trial. *British Journal of Psychiatry, 195*(3), 266–267. doi: 10.1192/bjp.bp.108.062414

Hayes, S. C., Follette, V. M., & Linehan, M. M. (Eds.). (2004). *Mindfulness and acceptance: Expanding the cognitive tradition.* New York, NY: Guilford.

Himelstein, S. (2011). Mindfulness-based substance abuse treatment for incarcerated youth: a mixed method pilot study. *International Journal of Transpersonal Studies, 30*(1-2), 1-10. doi: 10.24972/ijts.2011.30.1-2.1

Hutchison, P., Cox, S., & Frings, D. (2018). Helping you helps me: Giving and receiving social support in recovery groups for problem gamblers. *Group Dynamics: Theory, Research, and Practice, 22*(4), 187–199. doi: 10.1037/gdn0000090

Jiménez-Murcia, S., Fernández-Aranda, F., Granero, R., & Menchón, J.M. (2014). Gambling in Spain: update on experience, research and policy. *Addiction, 109*(10), 1595-1601. doi: 10.1111/add.12232

Katz, D., & Toner, B. (2013). A systematic review of gender differences in the effectiveness of mindfulness-based treatments for substance use disorders. *Mindfulness*, *4*(4), 318-331. doi: 1007/s12671-012-0132-3

Korn, D. A., & Shaffer, H. J. (1999). Gambling and the Health of the Public: Adopting a Public Health Perspective. *Journal of Gambling Studies, 15*(4), 289–365.

Lakey, C.E., Campbell, W, K., Brown, K.W., & Goodie, A.S. (2007). Dispositional Mindfulness as a Predictor of the Severity of Gambling Outcomes. *Personality and Individual Differences*, *43*(7), 1698–1710. doi: 10.1016/j.paid.2007.05.007

Leigh, J., Bowen, S., & Marlatt, A. (2005). Spirituality, mindfulness and substance abuse. *Addictive Behaviors*, *30*(7), 1335–1341. doi: .1016/j.addbeh.2005.01.010

Levin, M.E., & Hayes, S.C. (2012). Introduction: contextual cognitive behavioral therapies for addictive behaviors. En S.C. Hayes & M.E. Levin (coords.), *Mindfulness & acceptance for addictive behaviors: Applying contextual CBT to substance abuse & behavioral addictions* (pp-1-28). Oakland, CA: New Harbinger Publications.

Li, W., Garland, E. L., McGovern, P., O'Brien, J. E., Tronnier, C., & Howard, M. O. (2017). Mindfulness-oriented recovery enhancement for internet gaming disorder in U.S. adults: A stage I randomized controlled trial. *Psychology of Addictive Behaviors, 31*(4), 393–402. doi: 10.1037/adb0000269

Li, W., Garland, E. L. & Matthew, O. (2018). Terapeutic mechanisms of Mindfulness-Oriented Recovery Enhacemente for internet gamind disorder: Reducing craving and addictive behavior by targeting cognitive processes. *Journal of Addictive Diseases, 37*(1-2), 5-13. doi:10.1080/10550887.2018.1442617

López Viets, V. C., & Miller, W. R. (1997). Treatment approaches for pathological gamblers. *Clinical Psychology Review, 17*, 689-702. doi:10.1016/s0272-7358(97)00031-7

Marlatt, G. A., & Gordon, J. R. (1985). *Relapse prevention: A self-control strategy for the maintenance of behavior change.* New York: Guilford.

Marlatt, G.A., Witkiewitz, K., Dillworth, T.M., Bowen, S.W., Parks, G.A., Macpherson, L.M…, et al. (2004). Vipassana Meditation as a Treatment for Alcohol and Drug Use Disorders. En S.C Hayes., V.M Follette & M.M Linehan (coords.) *Mindfulness and acceptance: Expanding the cognitive-behavioral tradition* (pp. 261-287). New York: The Guilford Press.

Maynard, B. R., Wilson, A. N., Labuzienski, E., & Whiting, S. W. (2018). Mindfulness-based approaches in the treatment of disordered gambling: A systematic review and meta-analysis. *Research on Social Work Practice*, *28*(3), 348-362. doi: 10.1177/1049731515606977

McIntosh, C. C., Crino, R. D., & O'Neill, K. (2016). Treating problem gambling samples with cognitive behavioural therapy and mindfulness-based interventions: a clinical trial. *Journal of Gambling Studies*, *32*(4), 1305-1325. doi:10.1007/s10899-016-9602-1

McIntosh, C., & O'Neill, K. (2017). *Evidence-based Treatments for Problem Gambling*. Cham (Switzerland): Springer.

Menchon, J. M., Mestre-Bach, G., Steward, T., Fernández-Aranda, F., & Jiménez-Murcia, S. (2018). An overview of gambling disorder: from treatment approaches to risk factors. *F1000Research*, *7*, 1-8. doi: 10.12688/f1000research.12784.1

Novak, D.E., & Aloe, A.M. (2014). The prevalence of pathological gambling among college students: a meta-analytic synthesis, 2005-2013. *Journal of Gambling Studies, 30*(4), 819-43. doi: 10.1007/s10899-013-9399-0.

Peters, J. R., Erisman, S. M., Upton, B. T., Baer, R. A., & Roemer, L. (2011). A preliminary investigation of the relationships between dispositional mindfulness and impulsivity. *Mindfulness, 2*, 228–235. doi: 10.1007/s12671-011-0065-2

Petry, N.M. (2005). Stages of change in treatment-seeking pathological gamblers. *Journal of Consulting and Clinical Psychology, 73*(2), 312-322. doi: 10.1037/0022-006X.73.2.312

Petry, N. M., Ammerman, Y., Bohl, J., Doersch, A., Gay, H., Kadden, R., et al. (2006). Cognitive-behavioral therapy for pathological gamblers. *Journal of Consulting & Clinical Psychology, 74*(3), 555–567. doi:10.1037/0022-006X.74.3.555

Reid, R.C., Di Tirro, C., & Fong, T.W. (2014). Mindfulness in patients with gambling disorders. *Journal of Social Work Practice in the Addictions, 14*(4), 327-337.doi: 10.1080/1533256X.2014.958493

Rogojanski, J., Vettese, L. C., & Antony, M. M. (2011). Coping with cigarette cravings: Comparison of suppression versus mindfulness-based strategies. *Mindfulness, 2(1),* 14-26. doi: 10.1007/s12671-010-0038-x

Romanczuk-Seiferth, N., Van den Brink, W., & Goudriaan, A.E. (2014). From Symptoms to Neurobiology: Pathological Gambling in the Light of the New Classification in DSM-5. *Neuropsychobiology, 70*, 95-102. doi: 10.1159/000362839

Sauer, S. E., & Baer, R. (2009). Responding to negative internal experience: Relationships between acceptance and change-based approaches and psychological adjustment. *Journal of Psychopathology and Behavioral Assessment, 31*, 378-386. doi:10.1007/ s10862-009-9127-3

Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2002). *Mindfulness-based cognitive therapy for depres- sion: A new approach to preventing relapse.* New York, NY: Guilford.

Schuler, A., Ferentzy, P., Turner, N. E., Skinner, W., Mclsaac, K. E., Ziegler, C. P. & Matheson, F. I. (2016). Gamblers Anonymous as a Recovery Pathway: A Scoping Review. *Journal of Gambling Studies, 32,* 1261–1278. doi:10.1007/s10899-016-9596-8

Shonin E, Van Gordon W, Griffiths M.D. (2013). Cognitive Behavioral Therapy (CBT) and Meditation Awareness Training (MAT) for the treatment of co-occurring schizophrenia with pathological gambling: A case study. *International Journal of Mental Health Addiction*, *12*(2), 181-196. doi: 10.1007/s11469-013-9460-3

Shonin, E., Gordon, W.V., & Griffiths, M.D. (2014). Mindfulness as a treatment for behavioural addiction. *Journal of Addiction Research, 5*(1) 1-2. doi: 10.4172/2155-6105.1000e122

Smith, D.P., Battersby, M.W., Pols, R.G., Harvey, P.W., Oakes, J.E., & Baigent, M.F. (2015). Predictors of Relapse in Problem Gambling: A Prospective Cohort Study. *Journal of Gambling Studies, 31*(1), 299–313. doi: 10.1007/s10899-013-9408-3

Stewart, R.M., & Brown, R.I. (1988). An outcome study of Gamblers Anonymous. *British Journal of Psychiatry, 152*, 284-288. doi: 10.1192/bjp.152.2.284

Toneatto, T., Pillai, S., & Courtice, E.L. (2014). Mindfulness-enhanced cognitive behavior therapy for problem gambling: a controlled pilot study. *International Journal of Mental Health and Addiction, 12*(2), 197-205. doi: 10.1007/s11469-014-9481-6

Toneatto, T., Vettese, L., & Nguyen, L. (2007). The role of mindfulness in the cognitive-behavioural treatment of problem gambling. *Journal of Gambling Issues*, *19,* 91-100. doi: 10.4309/jgi.2007.19.12

Von Hammerstein, C., Luquiens, A., Khazaal, Y., Benyamina, A., Aubin, H.J., & Romo, L. (2016). La pleine conscience dans le traitement des addictions: Quelles perspectives pour la prise en charge du jeu pathologique? *Alcoologie et Addictologie, 38*(4), 305-313.

Von Hammerstein, C., Miranda, R., Aubin, H. J., Romo, L., Khazaal, Y., Benyamina, A., & Luquiens, A. (2018). Mindfulness and cognitive training in a CBT-resistant patient with gambling disorder: A combined therapy to enhance self-control. *Journal of Addiction Medicine, 12*(6), 484-489. doi: 10.1097/ADM.0000000000000433.

Westphal, J. R. (2008). How well are we helping problem gamblers? An update to the evidence base supporting problem gambling treatment. *International Journal of Mental Health and Addiction, 6*, 249-264. doi: 10.1007/s11469-007-9072-x

Wickwire EM Jr, Burke RS, Brown SA, Parker JD, & May RK. (2008). Psychometric evaluation of the National Opinion Research Center DSM-IV Screen for Gambling Problems (NODS). *American Journal on Addictions 17*: 392–95.doi: 10.1080/10550490802268934.

Williams, J. M. G., Teasdale, J. D., Segal, Z. V., & Soulsby, J. (2000). Mindfulness-based cognitive therapy reduces overgeneral autobiographical memory in formerly depressed patients. *Journal of Abnormal Psychology, 109*, 150-155. doi: 10.1037/0021-843X.109.1.150

Witkiewitz, K., Lustyk, M.K., & Bowen, S. (2013). Retraining the addicted brain: a review of hypothesized neurobiological mechanisms of mindfulness-based relapse prevention. *Psychology of Addictive Behaviors, 27*(2), 351-65. doi: 10.1037/a0029258

Wölfling, K., Mörsen, C.P., Duven, E., Albrecht, U., Grüsser, S.M., & Flor, H. (2011). To gamble or not to gamble: At risk for craving and relapse – learned motivated attention in pathological gambling. *Biological Psychology,87*(2), 275-281. doi: 10.1016/j.biopsycho.2011.03.010

Yakut, E., Bayar, B., Meriç, A., Bayar, K., & Yakut, Y. (2003). Reliability and validity of reverse visual analog scale (right to left) in different intensity of pain. *The Pain Clinic*, *15*(1), 1-6. doi: 10.1163/156856903321196429

Zgierska, A., Rabago, D., Chawla, N., Kushner, K., Koehler, R., & Marlatt, A. (2009). Mindfulness meditation for substance use disorders: a systematic review. *Substance Abuse*, *30*(4), 266-294. doi:10.1080/08897070903250019.

Data sharing

Research data are not shared.