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# Twelve-Step Facilitated Versus Mapping-Enhanced Cognitive-Behavioral Therapy for Pathological Gambling: A Controlled Study

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**Abstract** This study examined the efficacy of two group treatments for pathological gambling, a node-link mapping-enhanced cognitive-behavioral group therapy (CBGT-mapping) and twelve-step facilitated (TSF) group treatment. Forty-nine participants meeting criteria for pathological gambling were recruited from local newspaper advertisements. These participants were randomly assigned to one of three conditions: TSF ($n = 11$), CBGT-mapping ($n = 18$), and Wait-List control ($n = 9$); 11 refused treatment prior to randomization. Outcome measures included number of DSM-IV criteria met, perception of control/self-efficacy, desire to gamble, and frequency of gambling episodes. Analyses revealed a significant treatment group × time interaction ($\eta^2_{partial} = .39$). Specifically, the group treatments resulted in significant improvements in the dependent measures, while the Wait-List group remained relatively stable. Overall, CBGT-mapping and TSF had no significant differences on any outcome measure at follow-up assessments. Analysis of post-treatment and 6-month follow-up reveal a significant improvement in gambling outcomes (i.e., fewer DSM-IV criteria met, greater self-efficacy, and fewer gambling episodes ($\eta^2_{partial} = .35$), with treatment gains maintained at 6 months. These results are consistent with previous research for group treatment for pathological gambling and provide support for the utility of TSF and a mapping-based CBT therapy as viable intervention for pathological gambling.

**Keywords** Pathological gambling · Group treatment · Cognitive–behavioral · Twelve-step · Mapping

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The current DSM-IV classification of pathological gambling is within the impulse control disorders, describing it as a preoccupation with gambling, reduction in the ability to control gambling, dishonesty about gambling and its consequences, and increased amounts wagered following losses (American Psychiatric Association [APA] 2000). These criteria for pathological gambling parallel criteria for substance use disorders; furthermore, the course of the addiction and the actual behavior of gambling have been regarded as similar to that of the course and consumption of other substances as well (Blanco 2005). Because of the behavioral similarities between pathological gambling and alcohol addiction, alcohol treatment has influenced many available treatments (National Research Council 1999). Some of these treatments include motivational interviewing in brief treatment (Miller et al. 1988; Petry 2005), node-link mapping (Melville et al. 2004; Dansereau et al. 1995; Joe et al. 1997), and Gamblers Anonymous (GA) or twelve-step (Ontario Problem Gambling Research Centre [OPGRC] 2003); some of these treatments have been found to be effective for pathological and problem gambling and will be further discussed. Rosenthal and Rugle (1994) suggested an integrated treatment with psychotherapy and an addictions-based model as an effective form of treatment for pathological gambling.

Currently, there is no standard treatment for pathological gambling; the literature is still quite limited and there is a need for more empirical research. Group therapy is often used in conjunction with other therapies in the treatment of pathological gambling (Griffiths and Macdonald 1999). Studies have included both individual and group treatment settings, with each having positive outcomes. However, Coman et al. (2002) reported that group treatment may be a stronger method for assisting individuals to achieve treatment goals because the group serves as a means for extra support, encouragement, and motivation for change. The lower cost of providing group treatment can make this an appealing option as well. Given the phenotypic similarities between pathological gambling and other addictive disorders, efficacious treatments for other addictive disorders (i.e., alcohol dependence) may inform treatments of pathological gambling.

Project MATCH was an 8-year multi-site study examining approaches to alcohol treatment, with the aim of determining how different attributes of patients (e.g., motivation, sociopathy, religiosity) would respond to various treatments and the best fitting or most effective treatments for these patients (Project MATCH Research Group 1997a). Specifically, the treatment modalities included Cognitive Behavioral Coping Skills Therapy, Motivational Enhancement Therapy, and Twelve-Step Facilitation Therapy (TSF). The studies found all three treatments included in the study to have beneficial effects (Project MATCH Research Group 1997a, b). A report by the Project MATCH Research Group (1998) stated that although they found few differences between the treatment groups in their 3-year follow-up study, the TSF group continued to be at a slight advantage over the other treatment groups. A commentary Project MATCH (Comments on Project MATCH 1999) reported those with fewer psychological problems to benefit more from TSF; no differences appeared among the treatment groups for individuals with severe psychological problems. This has direct implications for the utility of TSF as a treatment option for pathological gamblers. More research is needed to see if these treatments are equally effective and this study aims to address this issue as well.

## Gamblers Anonymous and Twelve-Step Facilitated Treatment

Just as twelve-step programs have been developed and widely accepted as an intervention for alcohol treatment, this approach has also been applied for pathological gambling. In

fact, GA is one of the most widely used interventions for gambling (Lesieur 1998; Petry 2005; Petry and Armentano 1999). GA attempts to help those with gambling problems abstain from gambling; group sessions typically include testimonials and bull-sessions (Scodel 1964). An outcome study conducted by Stewart and Brown (1988) reported dropout rates in GA as high as 70% and abstinence rates of only 8% at 1-year follow-up. High relapse rates have also been reported for those who participate in GA (National Research Council 1999). Overall, GA alone has demonstrated positive effects for only a small percentage of its participants with high dropout and relapse rates. These findings have led clinicians to alter the traditional GA approach or to utilize it in conjunction with other treatments. Research indicates GA, combined with other treatment, is effective (Korn and Shaffer 2004; Lesieur and Blume 1991). The current study followed some of the characteristics of the TSF treatment mentioned by Korn and Shaffer (2004), emphasizing the first five steps.

A recent quasi-experimental study examined the effectiveness of CBT to a twelve-step treatment approach (Toneatto and Dragonetti 2008). Both treatment conditions were effective at reducing amount of money spent on gambling with 48% of the sample remaining abstinent and 38% classified as controlled gamblers. Participants whose initial treatment goals were abstinence were more likely to attend more sessions; this goal as well as the number of sessions attended was positively related to treatment outcomes (e.g., amount wagered on gambling, frequency of gambling). The authors also note some inconsistency between DSM scores attained at follow-up and other treatment outcomes, suggesting the use of multiple indicators to establish treatment efficacy. Similar to other studies (e.g., Project MATCH), there was no different in CBT and the twelve-step intervention, with both conditions significantly improving gambling behaviors at 12-month follow-up. A major limitation of this study is the lack of a no-treatment or Wait-List group, which is integral when attributing the change in symptoms to the specific treatment and not other variables (e.g., time, treatment seeking behaviors, etc.). The current study addresses this limitation by including a Wait-List control group.

## Cognitive–Behavioral Treatment

Both cognitive and behavioral treatments have shown some positive effects in empirical studies (Arribas and Martinez 1991; Bujold et al. 1994; Ladouceur et al. 2003; Ladouceur, et al. 2001; McConaghy et al. 1991). Cognitive-behavioral therapy (CBT) is a widely used treatment approach that incorporates aspects of both behavioral and cognitive change principles. It has been growing in popularity in its use for treating problem and pathological gambling and its techniques are frequently used in helping individuals with gambling and gambling-related problems (Coman et al. 2002; Korn and Shaffer 2004). The goal of treatment is to change cognitive distortions, such as the illusion of control, that are associated with excessive gambling and its consequences as well as changing behavior (Korn and Shaffer 2004). Empirical and case studies provide support for CBT as a valid treatment for pathological gambling resulting in decreases in gambling frequency, decreased urges to gamble, and other positive life changes as well as maintenance of these improvements (Bannister 1977; Ladouceur et al. 1994; Sylvain et al. 1997; Toneatto and Sobell 1990).

One of the largest studies examining the efficacy of CBT for gambling was conducted by Petry et al. (2006). Specifically, this study compared the efficacy of three approaches: referral to GA, referral to GA plus a cognitive-behavioral workbook, and referral to GA

plus CBT. This study reported short- and long-term benefits of CBT over those attending GA alone, with GA attendance having a relationship to higher rates of abstinence across the entire sample. Although the study had several therapists providing therapy, the amount of contact was not controlled across the groups; therefore, it is unknown to what degree the amount of contact may have had on treatment outcomes. In summary, only recently have researchers begun to compare CBT to twelve-step treatment approaches. While each study has its own set of strengths and limitations, evidence-based research is needed to fully explore the benefits of these therapeutic approaches and to validate existing treatments. One treatment method that has been evaluated in treating substance abuse and pathological gambling is a node-link mapping-based approach to CBT.

## Mapping-Enhanced Treatment

Node-link maps have also been utilized in the treatment of substance abuse. In a node-link mapping-enhanced treatment, the client and counselor work together to produce a visual representation of the critical issues and possible solutions surrounding their problem, whether it is substance dependence or pathological gambling. These maps were first used by Dansereau et al. (1993) to enhance drug abuse counseling. Later studies found node-link mapping to increase positive outcomes for opioid users seeking participation in methadone treatment programs (Dansereau et al. 1995, 1996; Dees et al. 1997; Joe et al. 1997). These positive outcomes included fewer positive urine screens, fewer missed sessions, more motivation in the client during treatment, more session depth, and less criminal activity. In a less educated population of methadone clients, Pitre et al. (1996) found individuals in a mapping group were less likely to have used drugs and to have engaged in criminal activities compared to those in the standard counseling group.

Studies conducted by Melville et al. (2000, 2004) have utilized node-link maps developed specifically for enhancing group treatment for pathological gambling. In these studies, the client and counselor collaborate to fill in the nodes (i.e., boxes) as well as the links that connect the nodes. Specifically, the client's thoughts, feelings, and actions are placed in nodes and the links are used to describe the reciprocal relationships between the nodes, highlighting interrelations between thoughts, emotions, actions, and environmental influences. These maps allow the client and clinician to maintain clear and collaborative problem solving throughout treatment sessions (Melville et al. 2004). Melville et al. (2004) conducted a randomized, controlled two-part study examining the use of this node-link mapping-enhanced CBT in an 8-week group treatment program. Those in the mapping group had significant improvements in the number of DSM-IV criteria, depression, and anxiety, compared to those in a non-mapping group. Improvements were also found in gambling bout duration, amount of money spent gambling, ability to control their gambling urges, and desire to gamble.

The present study used the treatment manual developed by Melville (2000). The purpose of the present study was to compare the node-link-mapping-enhanced CBT group treatment used in previous studies (Melville et al. 2000, 2004) to a TSF approach for pathological gamblers seeking treatment. Additionally, to examine the effectiveness of the two treatments, a Wait-List control group was also included in the study. The control group was comprised of individuals placed a Wait-List for the duration of the 8-week treatment. They served as a comparison group receiving no treatment for the same amount of time as those in the treatment groups. This was done in order to examine if the effects of the treatment would be greater than that of natural recovery. The study expected to find both

forms of treatment to be effective and have differences in the types of improvements made during treatment (based on the background principles and focus of each treatment modality).

## Method

### Participants

The researcher recruited participants through an advertisement in a local newspaper. This ad solicited individuals who were at least 21 years of age and met criteria for pathological gambling. Forty-nine participants were recruited for the study; 32 females with a mean age of 46.44 and a mean education level of 13.26 years and 17 males with a mean age of 46.82 and a mean education level of 12.97 years. The sample was comprised of 42 Caucasians, six African-Americans, and one Asian; there were no significant differences between these groups in terms of age and education level. Individuals were assessed with the materials described below and then randomly assigned to one of three treatment conditions. Eleven of the original participants dropped out of the study prior to receiving information about their group assignment. The treatment groups included 18 assigned to the node-link-mapping-enhanced cognitive-behavioral group therapy (CBGT-mapping) condition, 11 assigned to the TSF group, and nine assigned to a Wait-List control group. Three participants in the CBGT-mapping group and two in the Wait-List group were lost to follow-up. Both the TSF and CBGT-mapping conditions used a small group format with 4 to 6 participants in each group.

### Materials

Standardized procedures were followed in completing all assessment materials. The South Oaks Gambling Screen (SOGS) (Cox et al. 2004; Lesieur and Blume 1987) was utilized as part of the inclusion criteria for the study. Other assessment materials included a client information form (including age, gender, and primary gambling activity), DSM-IV Criteria Interview (Cox et al. 2004), Assessment of Control (Melville et al. 2004; Sylvain et al. 1997), Timeline Follow-back (TLFB) (Hodgins and Makarchuk 2003; Sobell and Sobell 1992), the Beck Depression Inventory-Second Edition (BDI-II) (Beck et al. 1996), and the Beck Anxiety Inventory (BAI) (Beck and Steer 1990). The TLFB gathered information on a variety of gambling-related factors, including frequency of gambling, money spent gambling, and time spent gambling. The Assessment of Control asks participants to rate themselves on a 10-point Likert scale across three areas: ability to control their gambling (i.e., self-efficacy), ability to refrain from gambling in personally relevant situations, and desire to gamble (Sylvain et al. 1997). Only the ratings of control/self-efficacy and desire to gamble were used in the present study. Higher scores on 'control' indicate a greater amount of perceived control over gambling and indicate a greater degree of self-efficacy, while higher scores on 'desire' indicate a greater or more intense desire to gamble. These ratings have been used as outcome measures in previous studies (e.g., Ladouceur et al. 2001, 2003; Sylvain et al. 1997). Specifically, these studies have found that self-efficacy is related to better treatment outcomes and lower rates of relapse (Gomes and Pascual-Leone 2009), while greater desire to gamble is related to higher rates of relapse (Oei and Gordon 2008).

*Follow-up Measures*

The measures included the DSM-IV Criteria Interview, Assessment of Control, TLFB, BDI-II, and BAI. The DSM-IV Criteria Interview specifically focused over the past month at both follow-up assessments. Participants in all three conditions completed a post-treatment assessment, upon completion of the 8-week intervention and those in the CBGT-mapping group and TSF group completed these measures via telephone at a 6-month follow-up assessment, with the exception of the TLFB.

Procedure

This study was approved by the McNeese State University Institutional Review Board (IRB). All study procedures were performed in direct compliance with the IRB, ACA guidelines, and the APA Ethics Code. Individuals responding to the newspaper ad received an overview of the program and were asked about their willingness to participate. For each person who consented, the researcher collected their name and contact numbers and scheduled an assessment appointment. Participants read and signed all consent forms before the beginning of the assessment interview. During the assessment interview, participants were evaluated using the DSM-IV criteria as well as the SOGS (Lesieur and Blume 1987). Participants who met five or more DSM-IV criteria in the past year and endorsed five or more items on the SOGS (lifetime) met study criteria for pathological gambling and were then randomly assigned to one the three conditions: Wait-List, node-link mapping-enhanced cognitive-behavioral group therapy (CBGT-mapping), or TSF treatment. Participants were not specifically excluded or evaluated for severe mental illness. Participants who were randomly assigned to the Wait-List condition were informed, because of random assignment, there would be an 8-week wait until the next group would begin and they would be contacted when the next group would be available.

All participants who met study criteria completed the assessment interview, which took approximately 60 min. Within a week of the assessment interview, participants were randomly assigned to treatment condition and then received dates and times they were to begin the group treatment. Both treatment conditions included two weekly meetings, over the course of 8-weeks. At the end of the 8 weeks, the researchers conducted a follow-up assessment on participants in each condition. A 6-month follow-up was conducted by telephone for individuals in the two treatment conditions. Telephone-administration is a useful approach when conducting these types of assessments (e.g., Evans et al. 2004; Pinto-Meza et al. 2005) and this method reduced the number of participants lost to follow-up. Participants in the Wait-List condition were not contacted for 6-month follow-up because they began treatment at the end of the 8-week wait.

*GA Attendance*

Attendance at GA meetings was not part of the formal treatment intervention and was neither encouraged nor discouraged during the course of this study; however, participant attendance at such meetings was monitored. During the initial assessment, participants were asked to report the number of GA meetings they had attended in the last 30 days. Attendance was also monitored during their 8 week follow-up, again asking them to provide the number of GA meetings attended in the previous 30 days. Five participants had attended GA meetings within 30 days of starting group treatment and only three had attended GA within 30 days of completing the 8-week intervention. Although their

frequency of attendance at intake demonstrated a moderate, negative correlation with desire to gamble upon intake ($r = -.31$, $p = .03$), GA attendance (at intake or prior to post-treatment assessment) was not correlated with gambling-related variables post-treatment. Furthermore, GA attendance at post-treatment assessment was not related to experimental group assignment ($\chi^2 = .45$, $p = .80$) and only one participant from each group had attended GA meetings during the 8-week intervention.

Treatment Conditions

*Twelve-Step Facilitated Group Therapy*

The TSF is an 8-week program that consists of two 90-min group sessions per week for duration of the treatment. The researchers trained Masters-level counselors in this group treatment according to the *Twelve-Step Facilitation Manual* (Melville 2000). The treatment manual describes the twelve-step facilitation group therapy approach and the concepts of Motivational Enhancement Therapy for the counselors. Melville (2000) designed the treatment manual to guide individual treatment planning or for implementation as a primary treatment. As a primary treatment, TSF is a structured program with each session having a specific agenda and format. The treatment has objectives congruent with the GA view of pathological gambling; these objectives are in the following areas: cognitive, emotional, behavioral, social, and spiritual. Although the treatment is based on the twelve steps of GA, its primary focus is on the first five steps with each session comprised of specific recovery tasks and suggested reading material. Participants are also asked keep a journal throughout the 8-week intervention.

*Cognitive-Behavioral Group Therapy*

Cognitive-behavioral group therapy mapping was also an 8-week program, consisting of two 90-min sessions per week. Masters-level counselors were trained by the researcher specifically for this group treatment according to the *Three-Step Treatment Manual for Problem Gambling* (Melville 2000). The first two sessions include a formal assessment of all group members (completed by the counselor), rapport building activities, introduction of the node-link-mapping rationale and procedures, and a detailed imagination of a gambling experience. The remaining session included node-link mapping and were divided into three thought-sets: *Understanding Randomness*, *Problem-Solving*, and *Preventing Relapse*; each session utilized specific node-link maps corresponding to the topic of the session. The specific thought-sets targeted in this manual have been previously identified as important goals for change (Sylvain et al. 1997). Although the program can be administered in any order, the current study presented the information to the clients in the order presented in the treatment manual.

Data Analysis

Those who completed the intake assessment but refused to participate prior to starting the formal treatment were compared to those who chose to participate. There were no significant differences between these groups on any pre-treatment measures (Table 1) Participants that completed baseline assessment and follow-up assessments were retained for subsequent analyses. Three participants in the CBGT-mapping group did not complete the

**Table 1** Demographic and pre-treatment characteristics

| Variable | Refused treatment | Experimental group | | | F or $\chi^2$ | p | ES[a] |
|---|---|---|---|---|---|---|---|
| | | Wait-List | TSF | CBGT-mapping | | | |
| *Demographic* | | | | | | | |
| N | 11 | 9 | 11 | 18 | | | |
| Mean age in years (SD) | 42.45 (8.76) | 48.56 (10.38) | 47.64 (12.11) | 47.44 (10.50) | 0.75 | .53 | .05 |
| No. of women (%) | 9 (81.8) | 8 (88.9) | 6 (54.5) | 9 (50) | 5.96 | .11 | .35 |
| Ethnicity no. (%) | | | | | | | |
| African-American | 2 (18.2) | 1 (11.1) | 1 (9.1) | 2 (11.1) | 3.96 | .68 | .20 |
| Caucasian | 9 (81.8) | 8 (88.9) | 9 (81.8) | 16 (88.9) | | | |
| Other | – | – | 1 (9.1) | – | | | |
| Mean education in years (SD) | 13.73 (2.53) | 13.61 (2.64) | 12.71 (1.27) | 12.83 (1.54) | .82 | .49 | .05 |
| *Pretreatment* | | | | | | | |
| Mean DSM-IV criteria endorsed (SD) | – | 7.22 (2.22) | 6.73 (1.27) | 7.17 (1.29) | .34 | .71 | .02 |
| Mean SOGS lifetime score (SD) | 13.09 (2.74) | 12.33 (3.39) | 13.91 (1.22) | 12.72 (2.95) | .66 | .58 | .04 |
| Mean no. of gambling episodes (SD) | 6.82 (3.84) | 4.11 (2.67) | 4.72 (4.15) | 5.72 (4.91) | .84 | .48 | .05 |
| Mean money spent gambling (SD) | 1542.36 (1001.15) | 1056.67 (1079.90) | 1244.09 (1355.61) | 1548.17 (1585.70) | .36 | .78 | .02 |
| Mean control/self-efficacy (SD) | 3.18 (2.60) | 4.22 (1.30) | 5.00 (1.41) | 3.67 (1.85) | 1.95 | .14 | .12 |
| Mean desire to gamble (SD) | 7.00 (2.97) | 6.56 (2.70) | 4.55 (3.56) | 6.56 (3.09) | 1.17 | .33 | .07 |
| Mean BDI-II score (SD) | 26.55 (13.90) | 27.22 (13.82) | 14.36 (9.41) | 23.11 (12.47) | 2.39 | .08 | .14 |
| Mean BAI score (SD) | 20.09 (16.40) | 15.78 (13.23) | 10.70 (11.60) | 17.88 (12.93) | .93 | .44 | .06 |

*Note.* Baseline DSM-IV scores were not available for those who refused prior to treatment

[a] ES (effect size) estimated by $\eta^2_{partial}$ for ANOVAs and by $\varphi$ or $V$ for χ2 analyses

post-treatment assessment and one additional participant did not complete the 6-month follow-up assessment. Those who did not complete the post-treatment assessment had significantly lower BAI scores ($M = 6.00$, SD = 1.41) than those who completed the assessment ($M = 15.91$, SD = 12.82), $t(19.92) = 4.10$, $p = .001$ (equal variances not assumed). Doubly multivariate repeated measures analyses of covariance were employed to examine treatment outcomes. Significant main effects or interactions were further examined using univariate analyses and planned contrasts. Contrasts for the three experimental groups included: (1) treatment conditions vs. Wait-List, and (2) CBT-mapping vs. TSF. Contrasts for time included: (1) pre-treatment to post-treatment (i.e., post-treatment scores–pre-treatment scores), and (2) post-treatment to 6 month (i.e., 6-month scores–post-treatment scores), when applicable.

## Results

Sample Characteristics

Means and standard deviations for sample characteristics and pre-treatment scores are presented in Table 1. Groups (i.e., refused treatment, Wait-List, TSF, and CBGT-mapping) were similar across all demographic variables, depression and anxiety scores, and pre-treatment gambling factors. A separate contrast was conducted, comparing those who refused prior to treatment and those who agreed to treatment. Again, there were no significant differences between those who refused and those who agreed to participate in therapy ($p$s ranged from .21 to .90). Examination of treatment attendance revealed no significant difference in number of sessions attended between the CBGT-mapping ($M = 14.94$, SD = 1.83) and TSF ($M = 14.73$, SD = 1.62) groups, $t(27) = .32$, $p = .75$. Although the three groups did not differ on pre-treatment depression scores, several participants obtained scores beyond the clinical cut-off for moderate to severe depression. Given that BDI-II pre-treatment scores were correlated with numerous outcome variables (i.e., post-treatment self-efficacy $r = -.36$ and desire $r = .38$; 6-month self-efficacy $r = -.48$, desire $r = .67$, DSM-IV score $r = .46$; $p < .05$) and may affect treatment outcomes, they were used as covariates in the main outcome analyses.

Effects of Interventions on Gambling at Post-Treatment Assessment

Doubly multivariate repeated-measures analyses of covariance were used to compare gambling outcomes (i.e., frequency of gambling, money spent gambling, DSM-IV score, self-efficacy, desire to gamble) across time (i.e., pre-treatment and post-treatment assessments) for the Wait-List group, TSF group, and CBGT-mapping group after adjusting for pre-treatment depression scores. Analyses revealed an overall significant treatment group $\times$ time interaction, Wilks' $\lambda = .368$, $F(8, 52) = 4.22$, $p = .001$, $\eta^2_{partial} = .39$. BDI-II score was not a significant covariate ($p = .066$).

Univariate results indicated a significant Treatment Group $\times$ Time interaction for DSM-IV scores, $F(2, 29) = 17.60$, $p < .001$, $\eta^2_{partial} = .55$; self-efficacy, $F(2, 29) = 6.60$, $p = .004$, $\eta^2_{partial} = .31$; and gambling frequency, $F(2, 29) = 4.92$, $p = .014$, $\eta^2_{partial} = .25$, but not for desire to gamble, $F(2, 29) = .22$, $p = .80$, $\eta^2_{partial} = .02$. Planned contrasts were performed to compare both treatment groups to the Wait-List group and the CBGT-mapping group to the TSF group. The contrasts revealed that treatment groups experienced a significant decrease in the number of DSM-IV criteria met ($p < .001$) and an

**Table 2** Outcome measures during treatment and follow-up periods and results from regression model analyses

| Variable[a] | Pre-treatment | Post-treatment | 6-Month follow-up |
|---|---|---|---|
| Frequency of gambling episodes | | | |
| CBGT-mapping | 5.73 (5.38) | .67 (1.29) | – |
| TSF | 4.73 (4.15) | .18 (.60) | – |
| Wait-List | 4.29 (3.04) | 3.56 (3.08) | – |
| Money spent gambling | | | |
| CBGT-mapping | 1697.13 (1671.68) | 306.33 (963.37) | – |
| TSF | 1244.09 (1355.61) | 45.45 (150.76) | – |
| Wait-List | 1038.57 (1208.12) | 802.14 (829.75) | – |
| DSM-IV score | | | |
| CBGT-mapping | 7.47 (1.19) | 1.07 (1.16) | 2.33 (3.20) |
| TSF | 6.73 (1.27) | 2.00 (2.49) | 1.09 (1.81) |
| Wait-List | 7.86 (2.12) | 6.71 (2.43) | – |
| Perceived control/self-efficacy | | | |
| CBGT-mapping | 3.53 (1.77) | 7.67 (2.41) | 7.60 (2.80) |
| TSF | 5.00 (1.41) | 7.91 (2.30) | 9.00 (1.67) |
| Wait-List | 4.00 (1.41) | 3.86 (2.79) | – |
| Desire to gamble | | | |
| CBGT-mapping | 6.80 (3.78) | 3.53 (3.02) | 5.00 (3.18) |
| TSF | 4.55 (3.56) | 2.00 (1.41) | 2.64 (2.01) |
| Wait-List | 7.00 (2.94) | 4.86 (3.44) | – |

| Contrasts[b] | Post-treatment analyses | | | 6-Month follow-up analyses | | |
|---|---|---|---|---|---|---|
| | Time effect[c] | Contrast effect | Time × contrast | Time effect[d] | Contrast effect | Time × contrast |
| Frequency of gambling episodes | | | | | | |
| 1. Treatment—Wait-List | −3.25, .938 | −1.25, <.001 | −.57, .004 | – | – | – |

**Table 2** continued

| Contrasts[b] | Post-treatment analyses | | | 6-Month follow-up analyses | | |
|---|---|---|---|---|---|---|
| | Time effect[c] | Contrast effect | Time × contrast | Time effect[d] | Contrast effect | Time × contrast |
| 2. CBGT-mapping—TSF | | .16, .884 | .91, .616 | – | – | – |
| **DSM-IV score** | | | | | | |
| 1. Treatment—Wait-List | −4.05, .001 | −5.46, <.001 | −5.06, <.001 | −5.51, <.001 | – | – |
| 2. CBGT-mapping—TSF | | −.32, .582 | −1.22, .146 | .19, .068 | −.28, .616 | 1.20, .18 |
| **Perceived control/self-efficacy** | | | | | | |
| 1. Treatment—Wait-List | 2.32, .006 | 3.38, .030 | 3.82, .001 | 3.51, <.001 | – | – |
| 2. CBGT-mapping—TSF | | −.47, .499 | 1.92, .054 | .50, .396 | −.54, .369 | −1.01, .35 |
| **Desire to gamble** | | | | | | |
| 1. Treatment—Wait-List | −2.63, .252 | −1.74, .389 | −1.52, .342 | −2.97, .045 | – | – |
| 2. CBGT-mapping—TSF | | 1.11, .243 | −.32, .861 | 1.01, .187 | 1.22, .114 | −.42, .649 |

*Note.* Only participants with complete data included in this table (CBGT-mapping $n = 15$, TSF $n = 11$, Wait-List $n = 7$)

[a] Values represent mean difference (SD). [b] Values represent difference score and $p$. [c] Contrast compares pre-treatment to post-treatment (i.e., post–pre). [d] Contrast 1 compares pre-treatment to post-treatment (i.e., post–pre); contrast 2 compares post-treatment to 6-month follow-up (i.e., 6-month–post)

increase in self-efficacy ($p = .03$) over time. Results are depicted in Table 2 and Figs. 1, 2, 3, 4.

Effects of Interventions on Gambling from Pre-Treatment to 6-Month Follow-Up

Doubly multivariate repeated-measures analyses of covariance were also used to compare gambling outcomes (i.e., frequency of gambling, money spent gambling, DSM-IV score, self-efficacy, and desire to gamble) across time (i.e., pre-treatment, post-treatment, and 6-month assessments) for the TSF and CBGT-mapping groups, after adjusting for pre-treatment depression scores. Analyses revealed an overall significant effect of time, Wilks' $\lambda = .417$, $F(6, 96) = 8.76$, $p < .001$, $\eta^2_{partial} = .35$. The main effect of group and the Treatment Group $\times$ Time were not significant ($p = .22$ and .40, respectively). BDI-II score was a significant covariate ($p = .045$).

Univariate results indicated a significant change in scores over time for DSM-IV criteria met, $F(2, 50) = 28,75$, $p < .001$, $\eta^2_{partial} = .54$; and self-efficacy, $F(2, 50) = 21.61$, $p < .001$, $\eta^2_{partial} = .46$; however, there was only a trend for change in Desire to gamble over time, $F(1.40, 34.92) = 2.72$, $p = .096$, $\eta^2_{partial} = .10$. Contrasts for the effect of time reveal a significant change from pre-treatment to post-treatment for DSM-IV scores and self-efficacy ($ps < .001$), but scores did not significantly change from the post-treatment to 6-month evaluation, indicating that treatment gains were sustained over time. Overall, participants in the TSF and CBGT-mapping groups experienced significant treatment gains following the 8-week intervention and these gains were sustained over time. Results are depicted in Table 2 and Figs. 5 ,6 7.
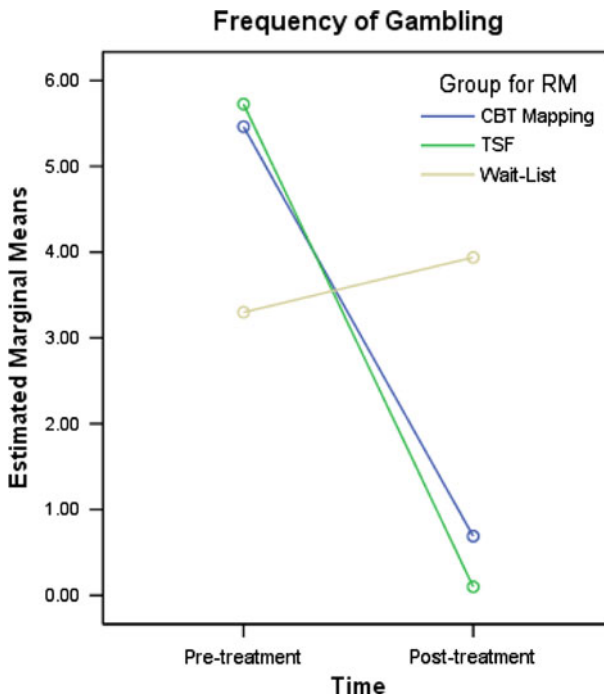


**Fig. 1** Frequency of gambling episodes by CBGT-mapping, TSF, and Wait-List groups at pre-treatment and post-treatment assessments
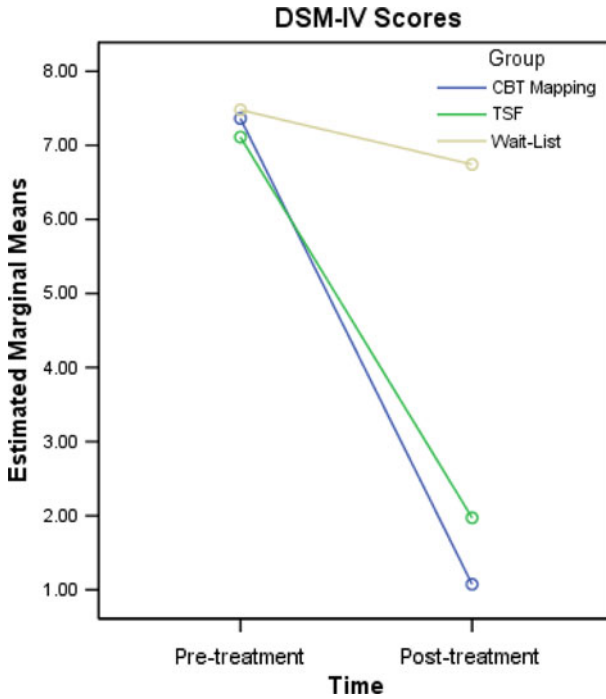
**Fig. 2** Number of DSM-IV criteria met by CBGT-mapping, TSF, and Wait-List groups at pre-treatment and post-treatment assessments

Secondary Outcome Analyses

Secondary analyses examined additional treatment outcomes among the CBGT-mapping and TSF groups. Specifically, a $\chi^2$ analysis was utilized to examine if meeting group assignment was related to meeting DSM-IV criteria for pathological gambling and/or abstinence rates at follow-up assessment. The results from these analyses are presented in Table 3. Examination of DSM-IV criteria met indicates a significant relationship, with a greater proportion of individuals in the Wait-List condition continuing to meet criteria at post-treatment assessment. Among those who received treatment, there was no a significant difference at the 6-month assessment. A similar pattern of results was found among abstinence rates, with participants in the CBGT-mapping and TSF groups having greater abstinence rates post-treatment. Although a greater proportion of those in the TSF group were abstinent at 6-month assessment, this was not a statistically significant difference. Overall, these secondary analyses provide support for the sustained effects of treatment after a 6-month period.

## Discussion

Treatment Outcomes

Those who were assigned to the Wait-List continued to meet criteria for pathological gambling, based on the number of DSM-IV criteria met at post-treatment assessment, and
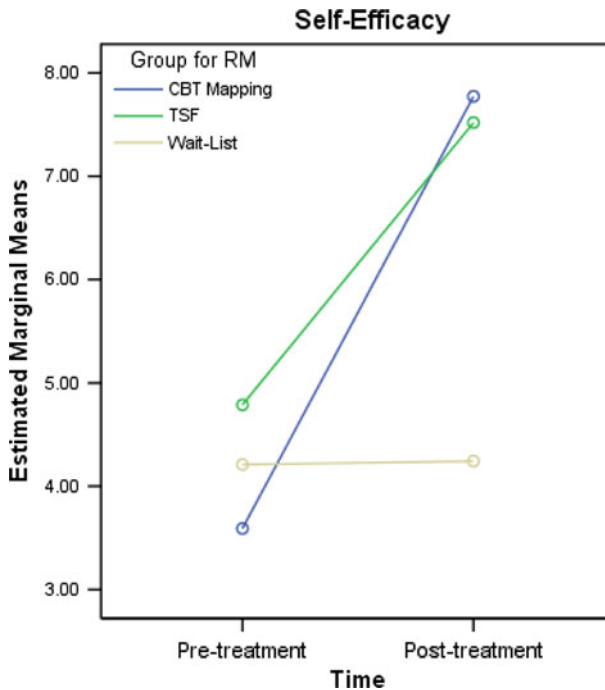
**Fig. 3** Self-efficacy by CBGT-mapping, TSF, and Wait-List groups at pre-treatment and post-treatment assessments

continued to exhibit difficulties across the outcomes measured (i.e., gambling frequency, self-efficacy, and desire to gamble). Among the intervention groups, both CBGT-mapping and TSF had sustained treatment gains at 6-month assessment and demonstrated no significant differences in terms of gambling outcomes, although a trend was noted in abstinence rates. Furthermore, the majority of these participants did not meet DSM-IV criteria at either follow-up assessment. Although it was not an initial aim of this study, attendance at GA meetings in the community was monitored during the intervention phase of the study. The fact that relatively few TSF members sought GA meetings suggests that the requirement of attending such meetings may not be necessary for treatment to be effective; additional studies are warranted to examine this possibility.

Overall, the results of the present study provide evidence that node-link-mapping-enhanced cognitive behavioral group treatment (CBGT-mapping) and TSF treatment are effective treatments for pathological gambling. Similar to previous studies, the twelve-step intervention was comparable to the cognitive-behavioral approach (Project MATCH Research Group 1998; Toneatto and Dragonetti 2008). Additionally, this is the second study providing support for the mapping-enhanced cognitive–behavioral treatment. Both the current study and Melville et al. (2004) found participants in the CBT treatment no longer met DSM-IV criteria following the intervention and resulted in an increase in control/self-efficacy as well as a decrease in desire to gamble, with treatment gains being maintained after 6 months.
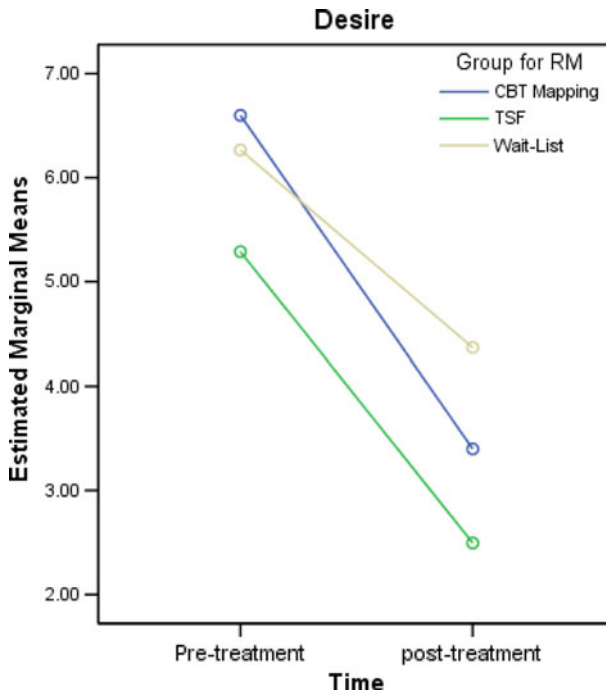
**Fig. 4** Desire to gamble by CBGT-mapping, TSF, and Wait-List groups at pre-treatment and post-treatment assessments

Strengths and Limitations

Strengths of the study include the random assignment of participants to treatment groups, controlled amount of time spent with therapist across treatment groups, inclusion of a Wait-List control group, and adherence to manualized treatment protocols in both treatment groups. Furthermore, this study presents a novel contribution to the literature, by extending on previous research (e.g., Melville et al. 2004; Toneatto and Dragonetti 2008) by comparing a node-link mapping-enhanced CBGT to a TSF approach. Although there is not a consensus regarding the best measures to determine treatment effectiveness and clinical recovery from pathological gambling, this study utilized easily administered measures that have been applied in previous studies. With a larger sample, additional measures could be used to evaluate treatment outcomes.

This study is not without limitations. Weaknesses of this study include the small sample size, unequal *n* per group, and the lack of evaluation for other psychiatric disorders. The small sample size decreased the power in the analyses, reducing the effect size as well as the number of outcome measures applied and the ability to detect statistical significance across these measures. Given that the pre-treatment depression and anxiety scores were related to gambling outcomes, stricter criteria should be applied when examining treatment efficacy. Studies should also focus on recruiting enough participants to account for refusals prior to treatment, drop-outs, and those who are likely to be lost to follow-up. An additional limitation of the study is the lack of control over treatment sought by participants
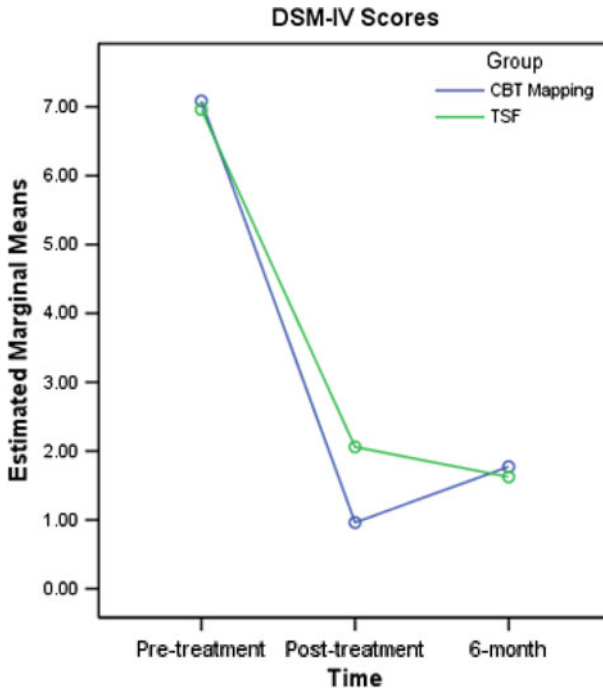
**Fig. 5** Number of DSM-IV criteria met by CBGT-mapping, TSF, and Wait-List groups at pre-treatment and post-treatment assessments

between the 8-week intervention and 6-month follow-up. To the authors' knowledge, participants in this sample did not participate in formal treatment following the intervention phase of this study; however, this was not formally evaluated at 6-month followup. Given that participation in treatment between post-treatment assessments could have an effect on treatment outcomes this should be better controlled or at least accounted for in future studies. Despite the fact that collateral information and self-reported response to treatment were not included in the present study, the results are considered to be an accurate estimate of their gambling behavior and criteria (e.g., Johnson et al. 2000). However, obtaining information from a collateral as well as self-reported response to treatment may strengthen results of future studies.

Summary and Future Directions

This controlled study found twelve-step facilitation and node-link-mapping-enhanced CBT as effective treatments for pathological gambling. The results were significant and they give support to TSF and CBGT-mapping as effective treatments suggesting they both be made available as treatment options. Although the effect sizes obtained in this study were relatively small, the results are quite meaningful. This is the first study to compare CBGT-mapping and TSF treatment approaches. Furthermore, the effects were sustained over time. As this is the first study evaluating these specific interventions, future research replicating this study with a larger sample may provide additional support to the efficacy of these

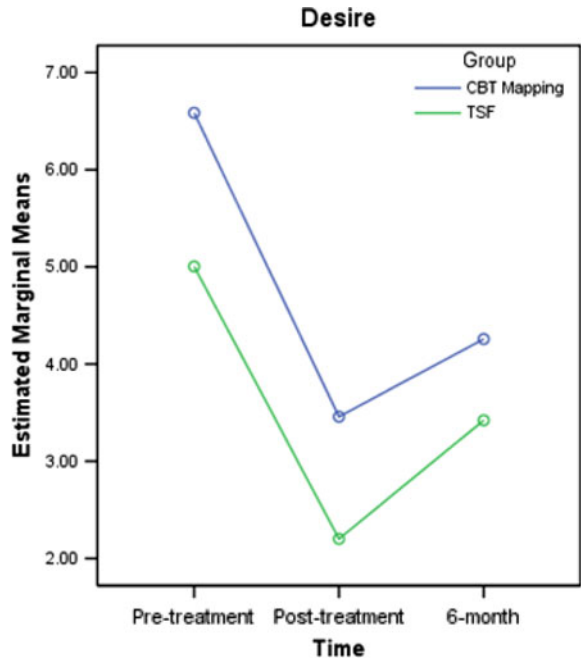**Fig. 6** Self-efficacy by CBGT-mapping and TSF groups across all assessment periods



**Fig. 7** Desire to gamble by CBGT-mapping and TSF groups across all assessment periods
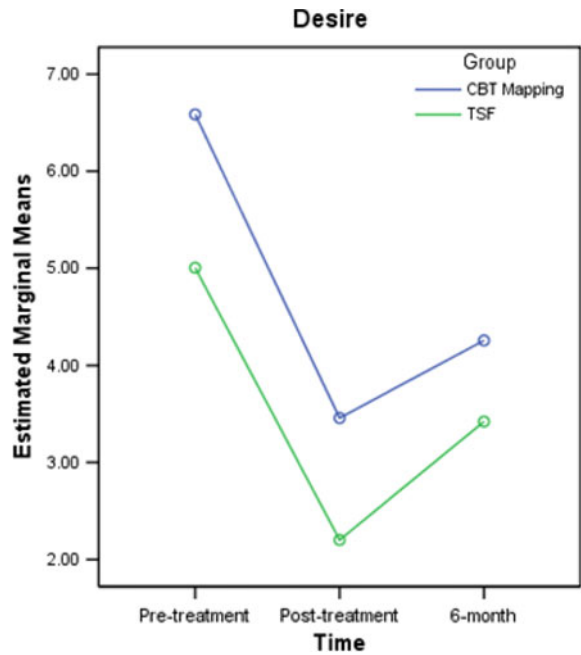
**Table 3** Number meeting DSM-IV criteria and remaining abstinent at follow-up periods

| Variable | Post-treatment | $\chi^2$ | $p$ | ES | 6-Month follow-up | $\chi^2$ | $p$ | ES |
|---|---|---|---|---|---|---|---|---|
| No. meeting DSM-IV criteria (%) | | | | | | | | |
| CBGT-mapping | 0 (0) | 19.79 | <.001 | .74 | 4 (22.2) | .83 | .36 | −.17 |
| TSF | 3 (27.3) | | | | 1 (9.1) | | | |
| Wait-List | 6 (85.7) | | | | – | | | |
| No. remained abstinent (%) | | | | | | | | |
| CBGT-mapping | 11 (78.6) | 12.81 | .002 | .63 | 8 (44.4) | 2.21 | .14 | −.28 |
| TSF | 10 (90.9) | | | | 8 (72.7) | | | |
| Wait-List | 1 (14.3) | | | | – | | | |

[a] ES (effect size) estimated by $\varphi$ (df = 1) or $V$ (df = 2)

manualized treatments. Additionally, future studies should examine the role of potential mediators and moderators of treatment effectiveness.

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