Cognitive–Behavioral Therapy for Pathological Gamblers

Nancy M. Petry, Yola Ammerman, Jaime Bohl, Anne Doersch, Heather Gay,
Ronald Kadden, Cheryl Molina, and Karen Steinberg
University of Connecticut Health Center

Few studies have evaluated efficacy of psychotherapies for pathological gambling. Pathological gamblers ($N = 231$) were randomly assigned to (a) referral to Gamblers Anonymous (GA), (b) GA referral plus a cognitive–behavioral (CB) workbook, or (c) GA referral plus 8 sessions of individual CB therapy. Gambling and related problems were assessed at baseline, 1 month later, posttreatment, and at 6- and 12-month follow-ups. CB treatment reduced gambling relative to GA referral alone during the treatment period and resulted in clinically significant improvements, with some effects maintained throughout follow-up ($ps < .05$). Individual CB therapy improved some outcomes compared with the CB workbook. Attendance at GA and number of CB therapy sessions or workbook exercises completed were associated with gambling abstinence. These data suggest the efficacy of this CB therapy approach.

Keywords: pathological gambling, cognitive–behavioral therapy, Gamblers Anonymous, treatment efficacy

Pathological gambling is classified as a disorder of impulse control (American Psychiatric Association, 1994) in which individuals risk things of substantial value on games of chance. About 1% of the population suffers from this disorder (Gerstein et al., 1999; Shaffer, Hall, & Vander Bilt, 1999; Welte, Barnes, Wieczorek, Tidwell, & Parker, 2001), and evidence suggests rates may be increasing with the spread of legalized gambling (Ladouceur, Jacques, Ferland, & Giroux, 1999; Room, Turner, & Ialomiteanu, 1999; Shaffer et al., 1999). Pathological gambling is associated with significant financial consequences, psychological and social impairment, and poor health (Gerstein et al., 1999; National Research Council [NRC], 1999; Shaffer et al., 1999; Welte et al., 2001).

Despite the prevalence and devastating consequence of this disorder, little is known about efficacious treatments for pathological gamblers. Gamblers Anonymous (GA) is the most popular intervention (NRC, 1999), but less than 10% of attendees become

actively involved in the fellowship, and overall abstinence rates are low (Petry, 2003a; Stewart & Brown, 1988). GA attendance is often espoused by professional gambling treatment programs (Petry, 2003a; Stinchfield & Winters, 1996), and the combined approaches may improve outcomes (Lesieur & Blume, 1991; Petry, 2003a; Russo, Taber, McCormick, & Ramirez, 1984; Taber, McCormick, Russo, Adkins, & Ramirez, 1987). However, review articles ubiquitously point to the lack of controlled studies in treating pathological gamblers (López-Viets & Miller, 1997; Petry & Armentano, 1999; Toneatto & Ladouceur, 2003).

Studies that exist suggest possible benefits of cognitive and cognitive–behavioral (CB) therapy. For example, Sylvain, Ladouceur, and Boisvert (1997) randomly assigned 40 pathological gamblers to a CB therapy or wait-list condition. Those receiving the CB therapy had greater reductions in gambling problems as noted by South Oaks Gambling Screen (SOGS) scores (Lesieur & Blume, 1987). These investigators (Ladouceur et al., 2001, 2003) also found benefits of a purely cognitive approach that focused on correcting irrational cognitions associated with gambling when compared with wait-list conditions. However, these studies did not include data from study withdrawals. Furthermore, long-term efficacy could not be determined because participants in wait-list conditions received the therapy and were not assessed further.

Echeburúa, Baez, and Fernandez-Montalvo (1996) randomly assigned 64 gamblers to one of four conditions: individual behavioral therapy, group cognitive therapy, the two treatments combined, or a wait-list condition. By use of an intent-to-treat analysis, the individual therapy improved outcomes relative to the wait-list control condition at one assessment point. None of the other conditions differed from one another, perhaps because of the small sample size and general reductions in gambling over time that occurred in all groups.

The purpose of this study was to evaluate the efficacy of a short-term, CB treatment in a larger sample and compare its efficacy to a real-world control condition—referral to GA. By using a non-wait-list control, we could examine efficacy examined

on a long-term basis. The CB therapy, like that developed for substance abuse (Monti, Kadden, Rohsenow, Conney, & Abrams, 2002), viewed gambling as a learned behavior that was used to cope with problems or adverse moods. It focused on developing skills to prevent relapse and promote alternatives for managing high-risk situations and moods. Another CB condition with no therapist contact was included because professional contact may impact outcomes. Workbooks can decrease problem behaviors (Apodaca & Miller, 2003) and have been applied to problem gamblers (Hodgins, Currie, & el-Guebaly, 2001). If efficacious, a CB workbook would have advantages of being low cost and widely accessible.

To evaluate the efficacy of CB therapy, the individual and workbook conditions were combined in the primary analyses, with the expectation that CB treatment would reduce gambling problems relative to GA referral. Another analysis assessed whether professional CB therapy improved outcomes relative to the workbook. To examine long-term effects of the interventions, gambling outcomes were evaluated throughout a 1-year period. Variables associated with abstinence were also investigated, with the hypothesis that GA attendance and participation in the CB treatment would be related to abstinence from gambling. Effects of the interventions on psychiatric symptoms and psychosocial functioning were also evaluated.

Method

Participants

Participants were recruited with media announcements between 1998 and 2002. Individuals who met *Diagnostic and Statistical Manual for Mental Disorders* (4th ed.; *DSM–IV*; American Psychiatric Association, 1994) criteria for pathological gambling, had gambled in the past 2 months, were 18 years or older, and could read at the 5th grade level were included. Exclusion criteria were current suicidal intentions, past-month psychotic symptoms, or already receiving gambling treatment. Individuals who appeared to meet these criteria upon telephone screening were invited to an in-person evaluation at an outpatient clinic, at which informed consent, approved by the university's institutional review board, was obtained. Figure 1 shows flow of potential participants through the protocol; 231 participants were eligible and randomized to a treatment condition. Computerized urn randomization (Stout, Wirtz, Carbonari, & Del Boca, 1994) balanced groups on lifetime SOGS scores, age, gender, ethnicity, and prior gambling treatment. Participants were randomized according to a 3:4:4 ratio for the three respective treatment conditions described below to account for the increased power required to determine differences between the two CB treatment conditions. Sample size was estimated at about 60, 80, and 80 for the three groups, calculated from effect sizes of other studies (e.g., Echeburúa et al., 1996; Sylvain et al., 1997) and adjusted for higher variability because of the use of an active control condition.

Treatments

The GA alone and GA plus workbook conditions were delivered in a one-time 10–15-min session; participants in these conditions did not meet again with a therapist.

Referral to GA alone. Participants were provided a list of the locations and meeting times of the 22 GA meetings held throughout the state of Connecticut, and GA was discussed, including prior attendance, expectations, and potential concerns. Participants were told that many people who become involved with GA reduce or stop gambling, and they were encouraged to select a GA meeting to attend.

Referral to GA plus CB treatment in workbook format. After GA referral, participants were given a 70-page workbook, containing CB exercises and a 24-page section on handling gambling-related debt (Petry, 1998). The workbook contained descriptions and fill-in-the-blank exercises identical to those in the therapy condition (see below). The evaluator instructed participants to complete one chapter a week for 8 weeks.

Referral to GA plus individual CB therapy. After the GA referral, participants met individually with a therapist 1 hr per week for 8 weeks. Sessions were structured by handouts that addressed (a) discovering triggers, (b) functional analysis, (c) increasing pleasant activities, (d) self-management planning, (e) coping with urges to gamble, (f) assertiveness training and gambling refusal skills, (g) changing irrational thinking, and (h) coping with lapses. A gambling-debt section was also provided, and most sessions had homework exercises. The handouts, homework, and full descriptions of the therapy are detailed by Petry (2005a).

Therapists

Ten masters-level and three doctoral-level therapists delivered the therapy. They received didactic training and close supervision of at least one case. Ongoing supervision consisted of regular review of therapy notes, audiotapes, and case discussion. Using a modification of the Yale Adherence Competence Scale (Carroll et al., 2000), four individuals rated audiotapes for CB and non-CB (psychoeducational/case management) items on a 7-point Likert scale (1 = *none/poor*, 3 = *some/adequate*, 7 = *extensive/exceptional*). Interrater reliability as assessed by the intraclass correlation coefficient was .83. For CB items, means and standard deviations were 4.3 ± 0.8 (reflecting average rankings of about *good/quite a bit*), compared with 1.1 ± 0.3 (reflecting average ratings of about *none/poor*) for non-CB items, which were not intended to be covered during the sessions.

Assessments

Assessments were administered at baseline and 1, 2 (posttreatment), 6, and 12 months later. Participants received $15 for Months 1 and 12 and $20 for Months 2 and 6 interviews.

Pathological gambling was assessed at baseline with a module adapted from the Structured Clinical Interview for *DSM–IV* (Grant, Steinberg, Kim, Rounsaville, & Potenza, 2004). The SOGS evaluated gambling problems at baseline and throughout the follow-up period, with scores of 5 and higher indicating pathological gambling. Both lifetime and past-month (Petry, 2003b; Sylvain et al., 1997) versions were used. At the time of study initiation, the SOGS was the most widely used, and only available, instrument with established psychometric properties (NRC, 1999). Recent data suggest it is highly correlated with *DSM–IV*-based criteria and other measures of gambling severity (Stinchfield, 2002).

The Addiction Severity Index (ASI; McLellan et al., 1988) evaluated problems in seven domains commonly affected by addictive disorders. Scores ranged from 0 to 1.0, with higher scores reflecting more severe problems. Psychometric properties have been established with substance abusers (McLellan et al., 1988) and general medical patients (Weisner, McLellan, & Hunkeler, 2000). The ASI has been adapted to include a Gambling section, which includes questions and scoring methods similar to ASI Drug scale scores (Petry, 2003b). The ASI Gambling section has adequate internal consistency, test–retest reliability, and validity in assessing gambling problems and changes in gambling over time (Lesieur & Blume, 1991; Petry, 2003b).

The timeline follow-back method (TLFB; Sobell & Sobell, 1992) consisted of calendar prompts used to elicit frequency and intensity of past behaviors. It has good test–retest reliability and validity for verifiable events (Sobell & Sobell, 1992), including gambling (Petry, 2003b; Weinstock, Whelan, & Meyers, 2004). Days gambled and amounts lost (wins–losses) daily were recorded.
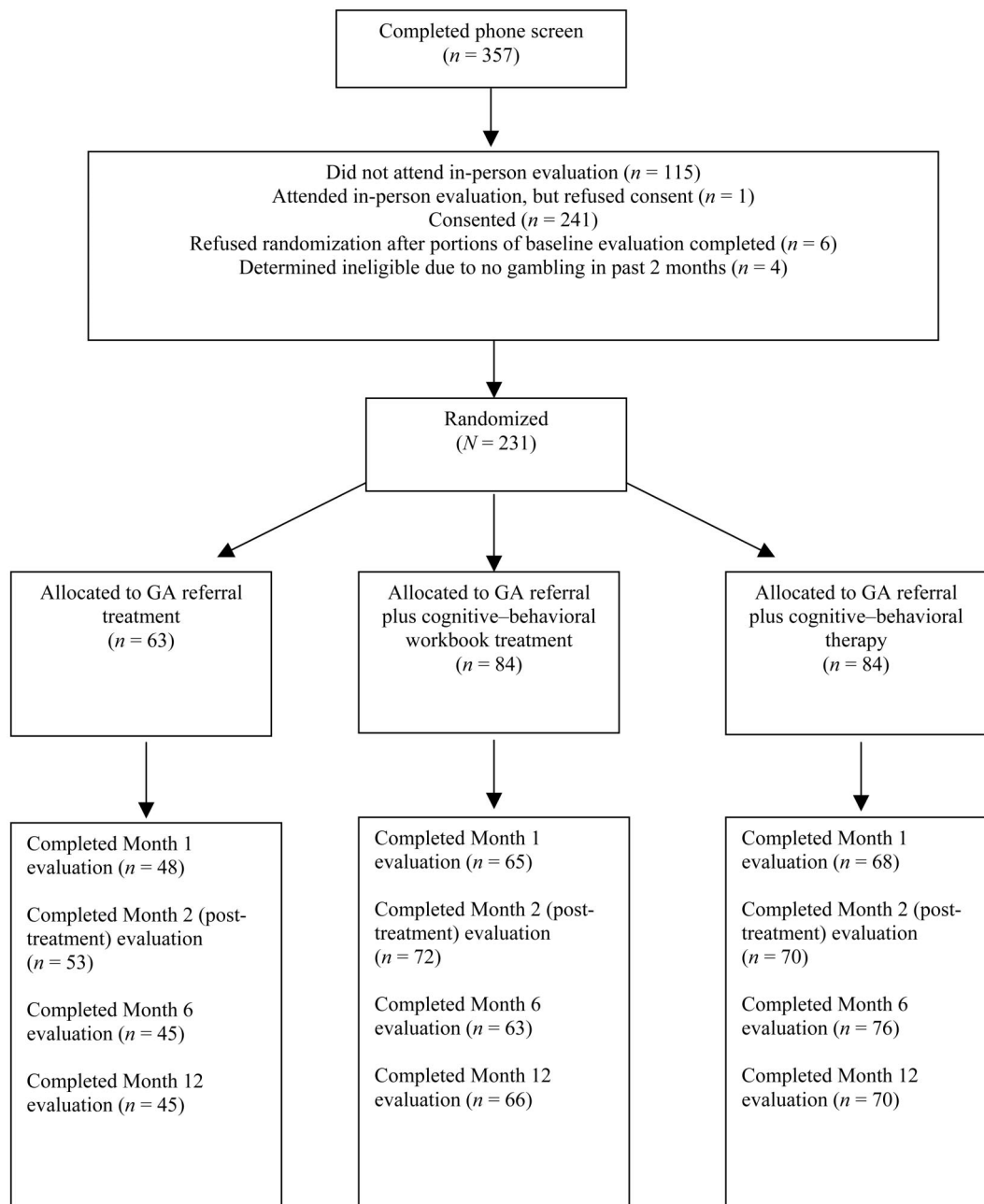
Figure 1. Flow of participants through study protocol. GA = Gamblers Anonymous.

The Brief Symptom Inventory (BSI; Derogatis, 1993) is a reliable and valid 53-item scale assessing past-week psychiatric symptoms. Items were rated on a 5-point scale, ranging from 0 (*not at all*) to 4 (*extremely*), with higher scores indicative of greater severity of symptoms, and a Global Severity Index was derived. The BSI was administered at baseline, posttreatment, and 6 months.

The Service Utilization Form (Rosenheck, Neale, & Frisman, 1995) evaluated type and frequency of services received, including GA. Satisfaction with the treatment provided in this study was evaluated posttreatment on a 0–9 Likert scale, with 0 described as *extremely dissatisfied*, and higher scores reflecting more satisfaction (9 = *extremely satisfied*).

Collaterals identified by participants were interviewed independently about the participants' gambling behaviors. Collaterals who agreed to participate (*N* = 176) were asked over the phone, "How often did (participant) gamble on average in the past month?" and "On days when (participant) gambled, how much money do you think s/he spent on average?" Responses to the first question were coded on a 5-point scale, from 0 = *not at all* to 4 = *four or more times per week*. Responses to the latter question were recorded as dollar amounts. Collaterals were also asked how many times the participant attended GA. Collateral assessment rates were 90.3%, 74.4%, 76.1%, 70.5%, and 62.5% at baseline and 1, 2, 6, and 12 months, respectively.

Participant follow-up rates ranged from 71.4%–90.0% in each condition at every postbaseline evaluation (see Figure 1). No differences in follow-up rates occurred across treatment groups, $\chi^2(2, N = 231) = 3.95, p > .14$, and some postbaseline data were available on all but 15 (6.5%) participants.

Data Analysis

Analysis of variance and chi-square tests examined baseline differences across groups. Nonnormally distributed data were transformed, including log transformations for dollars wagered and square root transformations for SOGS scores and days gambled. Nonparametric tests were used for data that could not be normally distributed (e.g., therapy participation).

Intent-to-treat analyses were conducted. The main analytic strategy was random effect regression (Hedeker, 1993), which models slopes on the basis of actual time of assessments. Hierarchical linear modeling analyses take into account whatever data are available for each participant, and all participants had at least baseline data available, which are included in the analyses. Time (days since beginning treatment) was included as a log-transformed variable to represent the larger slope expected from greater reductions in symptoms early in treatment. Primary gambling outcome variables were defined a priori as past-month SOGS scores and ASI Gambling scores, as these two measures represent composite indices of severity of gambling-related problems experienced. Days and dollars gambled in the last month were analyzed as secondary gambling outcome measures to provide a more intuitive account of gambling behaviors; they are included in deriving ASI Gambling scores and as such are protected against multiple comparisons when the main analysis is significant (Rosenthal & Rosenow, 1991).

Two contrasts were evaluated. The CB contrast assessed whether CB treatment (regardless of its mode of delivery) resulted in less gambling relative to GA referral alone. Contrast weights of -1 for GA referral and $+1$ for the CB conditions were assigned. The second contrast assessed mode of delivery of CB treatment, with contrast weights assigned as -1 for the workbook and $+1$ for the individual therapy condition; a weight of 0 was assigned to the GA referral condition. Contrast by time analyses evaluated whether groups differed over time. We conducted analyses from baseline throughout the 2-month treatment period and from baseline throughout the 12-month period to assess any enduring effects.

At the posttreatment evaluation, TLFB data were evaluated to ascertain longest duration of time without heavy gambling ($> \$5/day$). We compared mean durations across groups using Kruskal Wallis tests. We also compared proportions of participants who scored below the range of pathological gambling (< 5) on the past-month SOGS across groups using chi-square tests. Participants were also classified into one of four categories on the basis of past-month gambling at the posttreatment evaluation relative to pretreatment: (a) no change or an increase in dollar amounts gambled, (b) some reduction in gambling (21%–99% of baseline dollar amounts), (c) substantial decrease (20% or less than baseline amounts), or (d) gambling abstinence. These categories appeared clinically meaningful; at posttreatment, those categorized as not improved wagered an average of 12 days and spent a median of $1,378, those categorized with some reduction wagered an average of 8 days and a median of $500, and those categorized with substantial reductions gambled an average of 5 days and a median of $75. Kruskal–Wallis tests evaluated proportions of participants classified in these categories by treatment condition. So that the greatest number of participants in these analyses could be included, data from participants who missed the 2-month evaluation were included so long as they provided the relevant measures at a proximal evaluation (e.g., provided TLFB data through Months 1–2 of the study at the 6-month evaluation). Thus, sample sizes presented with the analyses do not always match the number of participants who completed each evaluation as scheduled and shown in Figure 1.

As an indicator of clinically significant change (Jacobson & Truax, 1991), individuals were classified into one of four categories on the basis of their posttreatment SOGS scores and TLFB data: recovered (posttreatment SOGS < 5 and a substantial decrease in gambling or gambling abstinence), improved (SOGS < 5 or substantial decrease in amounts gambled, but not both), unchanged (SOGS ≥ 5 and a small or no reduction in gambling amounts), or deteriorated (SOGS ≥ 5 and gambling post treatment ≥ 1 standard deviation higher than the group mean change from baseline to posttreatment). We used chi-square analyses to examine group differences.

We used logistic regressions to evaluate variables associated with past-month gambling abstinence posttreatment and at the 12-month evaluation. Sex, race, age, and baseline BSI and baseline ASI Gambling scores were entered in the first step. Sex and race (White vs. other) were dichotomous variables, and the others continuous. In Step 2, treatment group and number of GA sessions attended between baseline and the 2- or 12-month follow-up (as appropriate) were entered. The interaction between number of GA sessions and treatment group was entered in Step 3 to determine whether GA attendance differentially affected abstinence by condition.

To evaluate whether participation in CB therapy was associated with outcomes, logistical regressions were also conducted with only those participants assigned to a CB therapy intervention (as those in the GA condition did not receive any CB therapy). The models were similar to those above except that number of CB therapy sessions or workbook chapters completed was included as an additional variable in Step 2, and the interaction of therapy sessions or workbook chapters completed by treatment condition was the variable entered in Step 3.

Hierarchical linear modeling analyses, assessing both CB and mode contrasts as described earlier, were also conducted on BSI scores, as a measure of severity of psychiatric symptoms over time. These analyses were also performed for other ASI scores as secondary outcome measures of psychosocial functioning.

Results

Sample Description

Baseline indices are shown in Table 1. Groups generally were similar, and only one variable evidenced significant differences across conditions. The GA referral condition had lower ASI Gambling scores at treatment initiation than the other groups, $F(2, 228) = 3.19, p < .05$, so subsequent analyses of this variable took initial scores into account.

Treatment Participation

The number of GA meetings attended by the posttreatment evaluation did not differ across treatment conditions, Kruskal–Wallis $\chi^2(2, N = 209) = 1.50, p = .47$. As median values were 0 for each group, means (SD) are presented. Participants in the GA referral, workbook, and therapy conditions, respectively attended 1.7 (2.6), 2.1 (3.7), and 2.3 (4.9) GA meetings during the 2-month treatment period. At the 12-month evaluation, mean number of meetings attended were 7.6 (15.9), 6.8 (16.4), and 7.4 (20.4). According to data reported at the last follow-up conducted for each participant, about half the participants (41.3%, 38.1%, and 53.6% in the three groups) never attended any GA meetings during the year, and 12.5%, 11.5%, and 12.0% of participants, respectively, attended more than 12 times, $\chi^2(2, N = 216) = 1.67, p = .43$.

At a posttreatment evaluation, participants in the workbook condition brought in their workbook, and 28.9% did not complete any chapters. Another 34.3% completed 1–5 chapters, and 36.9% finished at least 6 chapters. Among participants assigned to individual CB therapy, 7.1% never attended any sessions, 32.2% attended 1–5 sessions, and 60.7% attended 6 or more sessions. Participation rates differed between conditions, $U(1, N = 160) = 2,246.5, p < .001$.

In terms of satisfaction with therapy received, mean (SD) ratings on the 10-point Likert scale with higher scores indicating more satisfaction were 5.7 (3.5), 7.1 (2.8), and 8.3 (2.2) for the GA

Table 1
Demographic and Baseline Characteristics

Demographic	GA referral	CB workbook	CB therapy	F or χ^2	df	p
N	63	84	84	231		
Mean age in years (*SD*)	44.4 (11.7)	44.3 (9.4)	45.8 (11.6)	0.48	2, 228	.62
No. of women (%)	33 (52.4)	36 (42.9)	35 (41.7)	1.92	2	.38
Ethnicity (no., %)				2.45	6	.87
African American	6 (9.5)	6 (7.1)	8 (9.5)			
European American	52 (82.5)	72 (85.7)	71 (84.5)			
Hispanic American	2 (3.2)	4 (4.8)	4 (4.8)			
Other	3 (4.8)	2 (2.4)	1 (1.2)			
Marital status (no., %)				0.41	6	.41
Never married	22 (35.5)	20 (23.8)	20 (23.8)			
Divorced/separated	16 (25.8)	24 (28.6)	20 (23.8)			
Widowed	2 (3.2)	2 (2.4)	6 (7.1)			
Married/remarried/cohabitating	22 (35.5)	38 (45.2)	38 (45.2)			
Employment status (no., %)				1.34	6	.97
Full time	36 (57.1)	49 (58.3)	46 (54.8)			
Part time	10 (15.9)	10 (11.9)	15 (17.9)			
Unemployed	13 (20.6)	18 (21.4)	17 (20.2)			
Other (retired/homemaker)	4 (6.3)	7 (8.3)	6 (7.1)			
Mean Income in dollars (*SD*)	42,430 (41,260)	43,595 (42,079)	46,100 (34,999)	0.17	2, 228	.84
Mean education in years (*SD*)	14.0 (2.4)	14.0 (2.5)	13.8 (2.4)	0.34	2, 228	.71
Substance use problems						
Mean past-month alcohol use in days (*SD*)	3.2 (5.4)	4.0 (7.0)	4.0 (7.7)	0.31	2, 228	.74
Drug use in past month (no., %)	7 (11.3)	11 (12.9)	6 (7.1)	1.60	2	.45
Substance abuse treatment (no., %)				2.74	4	.60
Never	42 (67.7)	59 (71.1)	66 (78.6)			
Past	13 (21.0)	15 (18.1)	13 (15.5)			
Current	7 (11.3)	9 (10.8)	5 (6.0)			
Gambling history						
Mean age first gambled in years (*SD*)	20.7 (11.5)	22.2 (10.9)	18.5 (10.7)	2.39	2, 228	.10
Prior treatment (no., %)	6 (9.5)	14 (16.7)	19 (22.6)	4.40	2	.11
Mean gambling debt in dollars (*SD*)	14,657 (26,381)	21,513 (61,980)	19,334 (57,511)	0.30	2, 228	.74
Mean *DSM* criteria endorsed (*SD*)	7.3 (1.7)	7.4 (1.7)	7.3 (1.8)	0.02	2, 228	.98
Mean SOGS lifetime score (*SD*)	12.5 (3.0)	12.8 (3.7)	12.4 (3.6)	0.38	2, 228	.68
Preferred gambling form (no., %)				7.19	12	.85
Electronic machines (slots)	26 (41.3)	39 (42.9)	34 (40.5)			
Cards	12 (19.0)	10 (11.9)	17 (20.2)			
Scratch/lottery	10 (15.9)	9 (10.7)	12 (14.3)			
Sports	4 (6.3)	11 (13.1)	5 (6.0)			
Animal races	3 (4.8)	6 (7.1)	7 (8.3)			
Craps or dice games	3 (4.8)	4 (4.8)	4 (4.8)			
Other	5 (7.9)	8 (9.5)	5 (6.0)			

Note. GA = Gamblers Anonymous; CB = cognitive–behavioral; SOGS = South Oaks Gambling Screen; *DSM* = *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.).

referral alone, CB workbook, and CB individual therapy conditions, respectively, $F(2, 168) = 11.02$, $p < .001$. Post hoc least significant differences tests revealed that all three groups differed significantly from one another (all $ps < .02$).

Effects of Interventions on Gambling During the Treatment Period

Table 2 shows data obtained regarding gambling variables throughout the treatment period. Time effects, indicating a reduction in gambling over time, were significant for all variables. The Time × CB contrast was significant for primary outcome measures, suggesting that improvement over time was greater in the CB than GA conditions. The Time × Mode contrast did not quite reach significance for ASI Gambling scores, but it was significant for SOGS scores.

Table 2 also shows that participants in the CB conditions decreased days gambled to a greater extent over time than those in GA referral alone, whereas those assigned to individual CB therapy reduced dollar amounts gambled at a greater rate than those receiving the CB workbook.

According to TLFB data, the longest period of nonheavy gambling (< $5/day) also varied across groups, $F(2, 188) = 3.06$, $p < .05$, $\eta = 0.18$. Between intake and posttreatment, the mean durations (*SD*) of consecutive nonheavy gambling days were 26.1 (6.0), 26.8 (4.8), and 35.3 (3.5) in the GA referral, CB workbook, and CB therapy groups.

Among those assigned to GA, 47.2% scored below 5 on the past-month SOGS, indicating nonpathological gambling, compared with 51.4% and 69.2% of those in the CB workbook and therapy conditions, $\chi^2(2, N = 205) = 7.82$, $p < .02$, $\phi = 0.195$.

Table 2
Outcome Measures During Treatment and Follow-Up Periods and Results From Random Regression Models Analyses

Variable[a]	Baseline	Month 1	Month 2	Month 6	Month 12
SOGS score					
GA referral	7.9 (3.8)	5.0 (4.4)	4.5 (4.3)	5.8 (4.1)	5.4 (4.8)
CB workbook	9.0 (3.7)	4.0 (3.8)	4.6 (4.8)	5.9 (4.8)	6.0 (4.6)
CB therapy	8.7 (3.9)	3.3 (3.1)	2.9 (3.6)	4.4 (4.5)	4.9 (4.5)
ASI Gambling score					
GA referral	0.65 (0.23)	0.45 (0.26)	0.46 (0.30)	0.37 (0.30)	0.39 (0.32)
CB workbook	0.74 (0.19)	0.44 (0.24)	0.44 (0.25)	0.42 (0.27)	0.38 (0.28)
CB therapy	0.72 (0.19)	0.42 (0.21)	0.36 (0.22)	0.34 (0.27)	0.32 (0.28)
Days gambled					
GA referral	14.2 (10.2)	9.0 (10.5)	8.0 (9.6)	7.9 (10.0)	7.0 (8.5)
CB workbook	14.7 (10.3)	6.3 (7.6)	6.1 (7.9)	5.7 (7.2)	5.9 (7.3)
CB therapy	13.3 (9.7)	5.2 (7.8)	4.5 (7.1)	6.3 (8.4)	6.0 (7.8)
Dollars gambled[b]					
GA referral	1,100 (3,600)	205 (960)	200 (1,100)	150 (1,200)	150 (1,075)
CB workbook	1,250 (2,825)	100 (488)	250 (1,000)	400 (1,500)	150 (1,000)
CB therapy	1,260 (3,500)	90 (388)	20 (500)	90 (712)	76 (700)

	During treatment analyses			Throughout follow-up analyses			
Contrast[c]	Time effect	Contrast effect	Time × Contrast	Contrast	Time effect	Contrast effect	Time × Contrast
SOGS score							
CB	−14.72, <.001	1.04, .29	−4.50, <.001	CB	−9.49, <.001	0.88, .38	−2.39, <.02
Mode		−0.51, .61	−4.11, <.001	Mode		−0.62, .53	−1.69, .09
ASI Gambling score							
CB	−15.82, <.001	2.21, <.05	−3.56, <.001	CB	−16.11, <.001	2.61, <.01	−3.51, <.001
Mode		0.50, .61	−1.66, .09	Mode		−0.94, .34	−1.99, <.05
Days gambled							
CB	−12.59, <.001	−0.38, .70	−1.91, <.05	CB	−11.06, <.001	0.09, .93	−1.21, .23
Mode		−0.62, .53	−1.32, .18	Mode		−1.02, 0.30	−0.01, .90
Dollars gambled							
CB	−12.61, <.001	−0.03, .97	−1.46, .14	CB	−10.74, <.001	0.40, 0.68	−0.73, .47
Mode		−0.14, .88	−2.11, <.05	Mode		−0.50, 0.61	−1.75, .08

Note. $N = 231$. ASI = Addiction Severity Index; SOGS = past-month South Oaks Gambling Screen CB contrast compares the GA referral alone group (−1) with the combined CB workbook and CB therapy groups (+1). Mode contrast compares the CB workbook group (−1) with the CB therapy group (+1). [a] Values represent raw means (*SD*), except where otherwise indicated. [b] Values represent medians and interquartile ranges. [c] Values represent *z* and *p*.

Significant differences among groups were also noted in terms of categorizing posttreatment gambling amounts, $\chi^2(2, N = 205) = 10.65$, $p < .01$, $\phi = 0.260$. Proportions of participants by group who were abstinent or had substantial, some, or no reductions in amounts gambled are shown in Figure 2 (top panel).

When we combined the two above indices (SOGS scores and dollar amounts wagered) to evaluate clinically significant changes, 59.0% of those in the CB therapy condition were classified as recovered, 37.2% as improved, and 3.8% as unchanged; no one in this condition had deteriorated. For those in the CB workbook condition, 39.2% were recovered, 41.9% improved, 16.2% unchanged, and 2.7% deteriorated. The proportions in the GA referral condition were 34.0% recovered, 43.4% improved, 18.9% unchanged, and 3.8% deteriorated. These proportions differed across groups, $\chi^2(6, N = 205) = 15.70$, $p < .02$, $\phi = 0.277$.

Variables Associated With Gambling Abstinence Posttreatment

Logistic regression identified variables associated with past-30-days abstinence at the posttreatment evaluation. Step 1, including demographics and baseline psychiatric symptoms and ASI Gambling scores, was not significant. Inclusion of treatment group and number of GA meetings attended in Step 2 improved the model, $\chi^2(3, N = 201) = 18.62$, $p < .001$. The number of GA meetings attended was positively associated with abstinence (odds ratio = 1.20, 95% confidence interval = 1.07–1.33). Treatment group was also significantly related to abstinence, with GA referral less likely associated with abstinence than individual CB therapy (odds ratio = 0.41, 95% confidence interval = 0.18–0.96).

Step 3 was also significant, $\chi^2(2, N = 201) = 9.72$, $p < .01$, and further improved the model, $\chi^2(10, N = 201) = 39.00$, $p < .001$. In the final model (Table 3, top left), male gender emerged as significantly related to gambling abstinence. Being in the CB therapy relative to GA referral group was also significantly associated with abstinence. The interaction of GA meetings by treatment condition was significant when we compared GA referral and individual CB therapy conditions, but this interaction was not significant when we compared CB workbook and therapy conditions ($p > .60$). No other variables were significantly associated with abstinence from gambling in this final model.
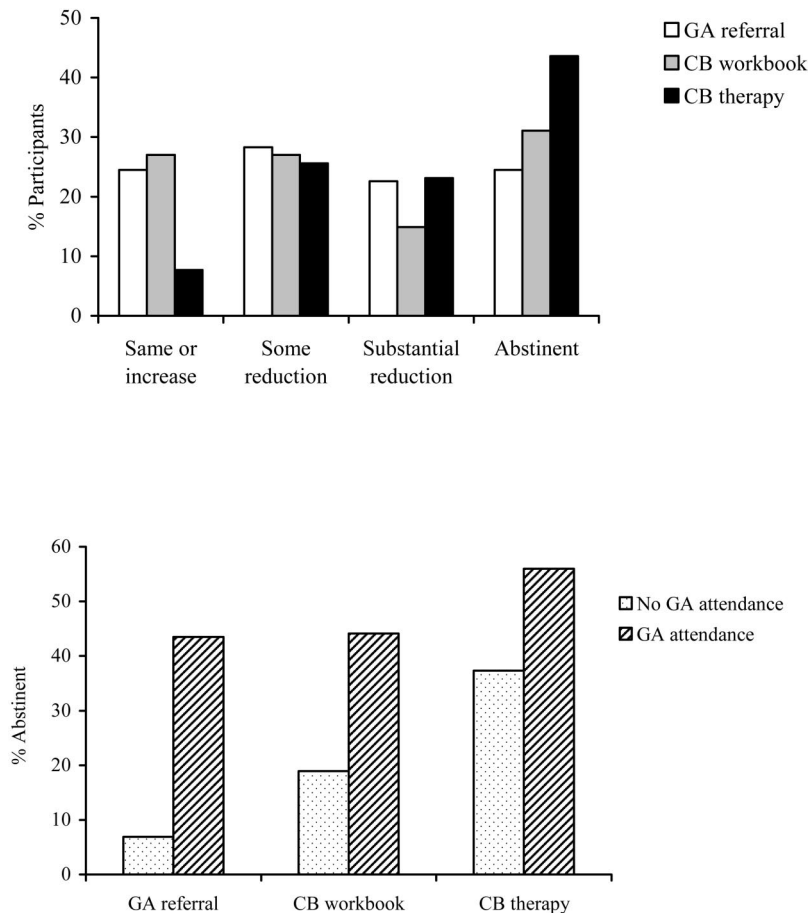
Figure 2. Top: Percentage of participants who reported gambling abstinence in the past 30 days at the posttreatment evaluation, substantial reductions in gambling (less than 20%), some reductions in gambling, or no change or an increase in amounts wagered relative to baseline rates. Bottom: Percentage of participants reporting gambling abstinence in the past 30 days at the posttreatment evaluation. Data are presented separately for those who attended one or more Gamblers Anonymous (GA) meetings and those who did not attend any GA meetings in each of the three treatment conditions. CB = cognitive–behavioral.

This interaction is depicted in Figure 2 (bottom panel, $N = 201$). Among those assigned to the GA referral alone condition, participants who attended GA at least once during the treatment period were more likely to be abstinent at the follow-up than participants who never attended GA. For those assigned to a CB condition, benefits of attending GA were less pronounced.

Another regression included only those participants assigned to a CB condition as an evaluation of whether participation in CB therapy was associated with abstinence. Step 1, including baseline variables, was not predictive of abstinence ($p > .45$). However, Step 2 was significant, $\chi^2(3, N = 148) = 15.04$, $p < .01$, as was the model, $\chi^2(8, N = 148) = 19.72$, $p < .02$. Neither treatment condition nor GA attendance were significantly related to abstinence, but number of CB sessions or chapters completed was; the odds ratio (Table 3, bottom left) indicates that each CB session or chapter completed was associated with a 16% increase in probability of abstinence. Inclusion of the interaction term (Sessions or Chapters Completed × Treatment Condition) did not significantly improve the model ($p > .48$).

Long-Term Effects of the Interventions on Gambling

Table 2 (right-hand columns) and Figure 3 show gambling variables throughout the follow-up period. Time effects were still significant. Time × CB effects remained significant for past-month ASI Gambling and SOGS scores. The Time × Mode contrast was significant for ASI Gambling scores, with individual therapy resulting in lower scores than the workbook condition.

At 12-months, proportions of participants abstinent, substantially reduced, somewhat reduced, or no change on the basis of TLFB data did not differ by group, $\chi^2(6, N = 178) = 6.25$, $p = .39$, $\phi = 0.132$ (data not shown; percentages classified as abstinent or substantially reduced gambling were 60.5%, 60.0%, and 65.7% in the GA referral, CB workbook, and CB therapy conditions, respectively). Most participants reported some gambling during the year. Classifying participants as nonconsistently abstinent if they reported gambling at one or more follow-up revealed that only 7.1%, 8.1%, and 16.5% of participants in the three conditions

Table 3
Results From Logistic Regressions Predicting Gambling Abstinence

Variable	Posttreatment[a]			12-month evaluation[b]		
	β (SE)	Wald, p	Odds ratio (95% CI)	β (SE)	Wald, p	Odds ratio (95% CI)
Age	0.01 (0.02)	0.08, ns		−0.20 (0.02)	1.14, ns	
Gender	0.75 (0.36)	4.42, .04	2.12 (1.05, 4.27)	−0.28 (0.38)	0.54, ns	
Race	0.20 (0.49)	0.16, ns		−0.10 (0.48)	0.53, ns	
ASI Gambling score	−0.64 (0.90)	0.51, ns		−1.14 (0.93)	1.51, ns	
Brief Symptom Inventory score	0.04 (0.24)	0.03, ns		−0.20 (0.26)	0.01, ns	
Treatment						
GA vs. CB therapy	−2.07 (0.68)	9.42, .01	0.13 (0.03, 0.47)	−0.79 (0.58)	1.81, ns	
CB therapy vs. CB workbook	−0.70 (0.42)	2.76, .09		−0.11 (0.45)	0.06, ns	
GA attendance	0.09 (0.06)	2.28, .13		0.05 (0.02)	4.44, .04	1.05 (1.00, 1.10)
GA Attendance × (GA vs. CB Therapy)	0.51 (0.19)	7.36, .01	1.67 (1.51, 2.40)		ns	
GA Attendance × (CB Therapy vs. CB Workbook)	0.05 (0.10)	0.23, ns			ns	
CB participants only						
Age	−0.00 (0.02)	0.00, ns		−0.41 (0.02)	3.14, .08	
Gender	0.60 (0.40)	2.23, ns		−0.30 (0.45)	0.44, ns	
Race	0.18 (0.56)	0.10, ns		−0.76 (0.62)	1.48, ns	
ASI Gambling score	−0.44 (1.01)	0.19, ns		−0.85 (1.15)	0.01, ns	
Brief Symptom Inventory score	0.15 (0.26)	0.33, ns		−0.13 (0.31)	0.19, ns	
Treatment (therapy vs. workbook)	−0.42 (0.38)	1.18, ns		1.16 (0.93)	1.53, ns	
GA attendance	0.93 (0.05)	3.45, .06		0.04 (0.02)	6.44, .01	1.04 (1.01, 1.08)
CB participation	0.15 (0.06)	5.24, .02	1.16 (1.02, 1.31)	0.25 (0.12)	4.41, .04	1.28 (1.02, 1.62)
CB Participation × Treatment		ns			ns	

Note. CI = confidence interval; ASI = Addiction Severity Index; GA = Gamblers Anonymous; CB = cognitive–behavioral; CB participation = number of CB therapy sessions attended or workbook chapters completed.
[a] $N = 201$; CB participants only $n = 148$.   [b] $N = 178$; CB participants only $n = 133$.

reported past-month gambling abstinence at all postbaseline assessments, $\chi^2(2, N = 208) = 4.02$, $p = .13$, $\phi = 0.139$.

Variables Associated With Gambling Abstinence at Follow-Up

At the 12-month evaluation, baseline variables were not associated with past-month abstinence ($p > .62$). Inclusion of Step 2 (treatment condition and number of GA meetings attended throughout the year) was significant, $\chi^2(3, N = 178) = 23.99$, $p < .001$, and improved the model, $\chi^2(8, N = 178) = 27.46$, $p < .001$. The number of GA meetings attended throughout the year was significantly related to abstinence at the 12-month follow-up (Table 3, top right). Inclusion of step 3 (interaction of GA meetings by treatment condition) did not improve the model ($p > .60$).

According to examination of participants assigned to a CB condition, Step 1 was not significant, but inclusion of Step 2 (treatment condition, GA meetings, and CB participation) was significant, $\chi^2(3, N = 133) = 16.39$, $p < .001$, as was the model, $\chi^2(8, N = 133) = 18.22$, $p < .02$. Step 3 (interaction of CB Participation × Treatment Condition) did not improve the model. Number of GA meetings attended was significantly associated with abstinence at Month 12 (Table 3, bottom right), as was the number of CB sessions or chapters completed during treatment. The odds ratios indicate that each GA session attended was associated with a 4% increased probability of abstinence, and each CB session or chapter completed was related to a 28% increase in abstinence at the 1-year follow-up.

Concordance With Collateral Reports

Spearman correlations between patient and collateral reports of gambling frequency and quantity were high, ranging from 0.44 to 0.92 (all $ps < .001$) across the three treatment groups and four postbaseline evaluations. The mean correlation was 0.62 for frequency and 0.68 for quantity of gambling. Using a dichotomous measure of any or no gambling in the past month, in only 19 (4.8%) of 400 pairs of reports did a collateral indicate gambling when the participant denied it. Seven discordant reports were in the GA, three were in the workbook, and nine were in the individual therapy condition.

Concordance was also high with respect to reports of GA meetings attended, with correlations ranging from .50 to .69 (mean correlation = 0.59, all $ps < .001$) across assessments. In only seven cases did a participant report attending GA but the collateral had no knowledge of it.

Other Outcome Measures

Changes in BSI Global Symptom Inventory scores over time were significant, $z = -8.23$, $p < .001$ (see Figure 4). Participants in the individual CB condition had greater reductions in psychiatric symptoms over time relative to participants in the CB workbook condition, $z = -1.91$, $p < .05$. The Time × CB contrast did not reach statistical significance, $z = -1.60$, $p = .10$.

At baseline, no significant differences in ASI scores were noted among groups. Drug scores were 0.00 for over 85% of participants and were not analyzed further. During the treatment period, de-
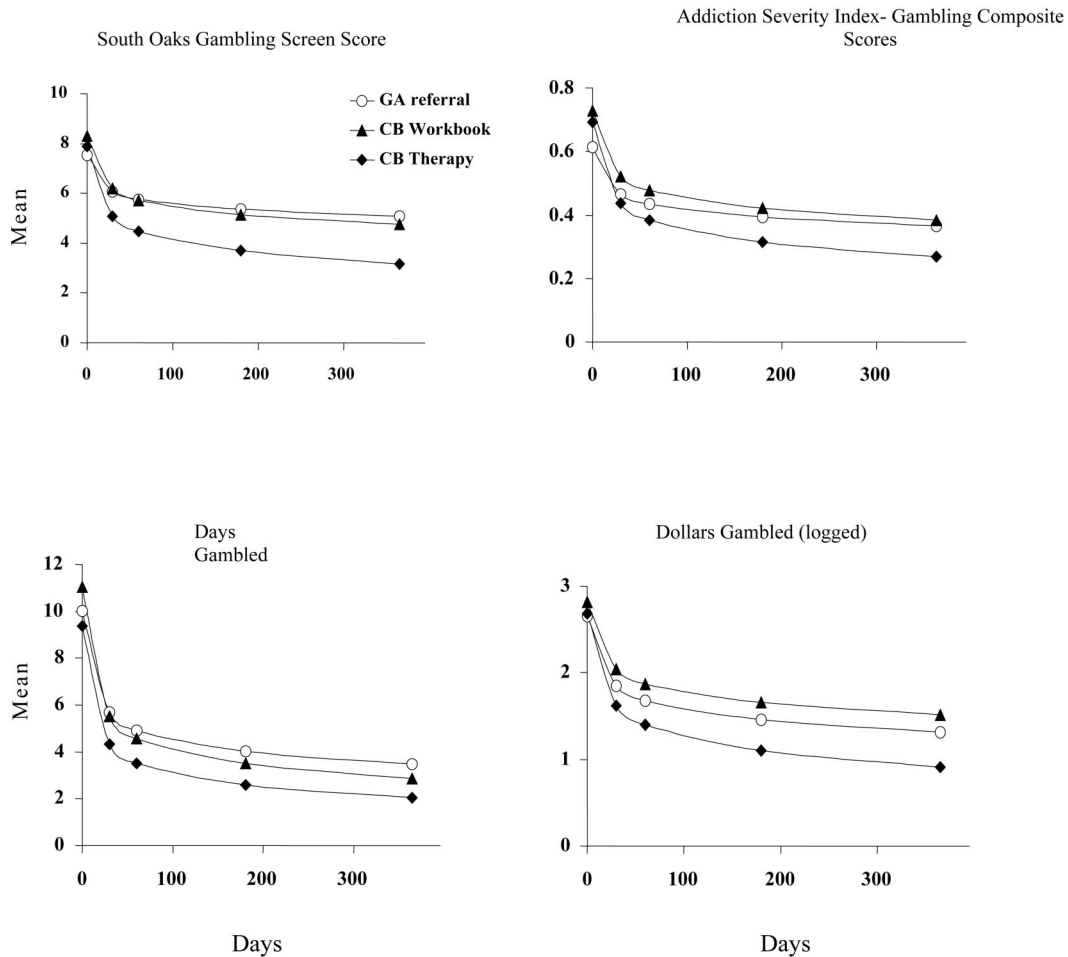
Figure 3. Gambling variables and days since randomization to a treatment condition. Values represent past-month measures and are estimates from random effects regression analyses, and as such do not always match raw means presented in Table 2. GA = Gamblers Anonymous, CB = cognitive–behavioral.
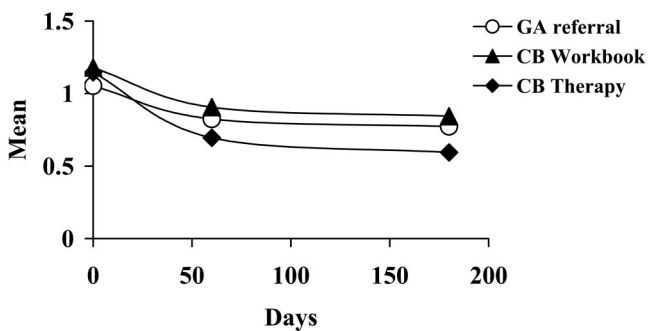

Figure 4. Brief Symptom Inventory scores and days since randomization to a treatment condition. Values represent past-week measures and are estimates from random effects regression analyses. The instrument was administered at baseline, posttreatment, and Month 6. GA = Gamblers Anonymous, CB = cognitive–behavioral.

creases in alcohol, legal, family/social, and psychiatric scores were noted for participants as a whole (see Table 4). Reductions in legal scores occurred only in the CB conditions, and the greatest decrease in psychiatric scores was noted in the individual CB therapy condition, with the Time × Mode contrast significant. Reductions in alcohol and family/social scores over time were unrelated to treatment assignment.

Throughout the follow-up, Time × Mode effects remained significant for psychiatric scores and emerged for medical scores, with the individual therapy condition showing declines in these problem areas over time relative to the workbook condition. Time × CB effects were also significant over the 1-year period for legal and psychiatric scores, with the GA group showing few changes over time, and the CB groups evidenced reduced scores over time.

Discussion

Gambling decreased among the majority of participants in this study, even those who were only referred to GA. Rates of GA involvement were consistent across conditions and comparable

Table 4
Addiction Severity Index Composite Scores and Results From Random Regression Models Analyses

Variable	Baseline	Midtreatment	End of treatment	Month 6	Month 12
Medical					
GA referral	0.33 (0.32)	0.26 (0.32)	0.33 (0.36)	0.32 (0.35)	0.29 (0.36)
CB workbook	0.30 (0.35)	0.26 (0.33)	0.33 (0.35)	0.31 (0.37)	0.30 (0.32)
CB therapy	0.36 (0.34)	0.26 (0.31)	0.35 (0.35)	0.24 (0.31)	0.31 (0.37)
Employment					
GA referral	0.24 (0.24)	0.28 (0.27)	0.27 (0.29)	0.25 (0.28)	0.29 (0.30)
CB workbook	0.26 (0.29)	0.25 (0.29)	0.25 (0.29)	0.28 (0.32)	0.27 (0.29)
CB therapy	0.25 (0.22)	0.25 (0.25)	0.23 (0.25)	0.25 (0.24)	0.25 (0.26)
Alcohol					
GA referral	0.12 (0.20)	0.07 (0.11)	0.06 (0.10)	0.04 (0.10)	0.08 (0.16)
CB workbook	0.08 (0.13)	0.07 (0.10)	0.06 (0.10)	0.05 (0.10)	0.08 (0.15)
CB therapy	0.06 (0.10)	0.05 (0.07)	0.04 (0.07)	0.05 (0.07)	0.05 (0.10)
Legal					
GA referral	0.03 (0.12)	0.03 (0.09)	0.03 (0.12)	0.02 (0.05)	0.03 (0.11)
CB workbook	0.07 (0.15)	0.03 (0.12)	0.04 (0.12)	0.02 (0.08)	0.01 (0.04)
CB therapy	0.08 (0.19)	0.04 (0.12)	0.02 (0.09)	0.03 (0.12)	0.02 (0.09)
Family/social					
GA referral	0.29 (0.24)	0.20 (0.22)	0.23 (0.25)	0.15 (0.19)	0.19 (0.20)
CB workbook	0.25 (0.23)	0.20 (0.21)	0.18 (0.19)	0.17 (0.19)	0.18 (0.21)
CB therapy	0.26 (0.20)	0.18 (0.18)	0.19 (0.19)	0.15 (0.17)	0.19 (0.21)
Psychiatric					
GA referral	0.31 (0.21)	0.25 (0.21)	0.29 (0.22)	0.28 (0.23)	0.28 (0.26)
CB workbook	0.31 (0.20)	0.23 (0.21)	0.26 (0.21)	0.27 (0.23)	0.24 (0.24)
CB therapy	0.33 (0.22)	0.22 (0.a9)	0.20 (0.18)	0.20 (0.20)	0.20 (0.21)

Note. Values are raw mean scores (*SD*). CB contrast compares the GA referral alone group (−1) with the combined CB workbook and CB individual therapy groups (+1). Mode contrast compares the CB workbook group (−1) with the CB individual therapy group (+1). GA = Gamblers Anonymous; CB = cognitive–behavioral.

with other studies (Petry, 2003a; Stewart & Brown, 1988; Stinchfield & Winters, 1996). Reductions in gambling with minimal interventions such as GA referral may be similar to results reported in placebo arms of pharmacotherapy studies (e.g., Blanco, Petkova, Ibanez, & Saiz-Ruiz, 2002; Kim, Grant, Adson, & Shin, 2001). A longitudinal study of non-treatment-seeking young adults found that many individuals who met diagnostic criteria for pathological gambling at one point did not meet criteria 3–4 years later (Slutske, Jackson, & Sher, 2003), and natural recovery has been well documented among gamblers recruited from community samples (Hodgins, Makarchuk, el-Guebaly, & Peden, 2002). These effects may reflect a strong desire to stop gambling, which manifests in reductions in gambling without formal treatment, or prior to or during initial stages of treatment (Petry, 2005b). The present study, nevertheless, did not evaluate natural recovery; instead, it compared relative efficacy of three interventions in reducing gambling among treatment-seeking pathological gamblers.

Although participants as a whole decreased gambling, benefits of CB therapy emerged in both primary outcome measures during the treatment period, and some improvements continued throughout the year. These effects were noted even when a very conservative approach to data analyses was used, with the CB individual therapy and workbook groups combined. This approach was selected because it controls, at least partially, for potential effects of meeting with a therapist; that is, half of the sample in the combined CB condition, similar to all of the patients in the GA alone condition, did not meet with a therapist. Although CB treatment as a whole improved outcomes, these benefits seemed to be driven primarily by the individual therapy condition. In examining the figures, the workbook condition evidenced only marginal improvements, if any, relative to the GA referral alone condition.

Decreases in some psychosocial problems also occurred. Changes in psychiatric symptoms were dependent upon treatment conditions, with participants in individual CB therapy showing the greatest reductions over time. Legal scores decreased to a greater degree in CB treatments relative to GA alone, but scores were low in all groups. Substance use was low at baseline and all assessments. Other studies also found that although substance use problems are common in gamblers (Cunningham-Williams, Cottler, Compton, & Spitznagel, 1998; Gerstein et al., 1999; Shaffer et al., 1999; Welte et al., 2001), few treatment-seeking gamblers have current substance use disorders (Ibanez et al., 2001; Petry, 2005a).

Although gambling abstinence throughout the 1-year study period was rare, point prevalence rates of past-month abstinence were around 30% at each evaluation. Some variables associated with abstinence were identified. Male gender was associated with gambling abstinence in one analysis. No known prior reports have found gender differences in outcomes of pathological gamblers entering treatment, and the gender effect in this study was only significant at the posttreatment evaluation, and not throughout follow-up. Number of GA meetings attended was significantly associated with gambling abstinence. GA attendance has been linked to improved outcomes, especially abstinence-oriented out-

Contrast	Time effect	Contrast effect	Time × Contrast	Contrast	Time effect	Contrast effect	Time × Contrast
Medical							
CB	−1.63, 0.10	−0.07, 0.94	0.38, 0.70	CB	0.31, 0.75	1.36, 0.17	−0.99, 0.32
Mode		1.27, 0.21	−1.35, 0.18	Mode		1.32, 0.18	−2.16, <.05
Employment							
CB	−0.99, 0.32	0.62, 0.53	−1.43, 0.15	CB	3.07, <.01	2.66, <.01	−1.92, 0.06
Mode		−0.50, 0.61	−0.36, 0.72	Mode		0.01, 0.99	−0.87, 0.38
Alcohol							
CB	−2.95, <.05	−1.99, <.05	1.50, 0.13	CB	−3.35, <.01	−4.45, <.01	1.80, 0.07
Mode		−0.86, 0.39	0.14, 0.88	Mode		−1.12, 0.26	0.06, 0.95
Legal							
CB	−3.19, <.01	2.02, <.05	−2.16, <.05	CB	−2.92, <.01	2.37, <.05	−3.13, <.01
Mode		0.97, 0.33	−0.75, 0.45	Mode		0.91, 0.36	−0.50, 0.61
Family/social							
CB	−5.31, <.001	−1.36, 0.17	0.52, 0.60	CB	−3.41, <.001	0.18, 0.85	−0.74, 0.45
Mode		0.41, 0.68	−1.00, 0.31	Mode		0.37, 0.71	−1.37, 0.17
Psychiatric							
CB	−5.22, <.001	0.59, 0.55	−1.36, 0.17	CB	−1.35, 0.18	2.15, <.05	−3.41, <.001
Mode		1.28, 0.20	−2.49, <.01	Mode		−0.36, 0.72	−2.72, <.01

comes, in other reports (Lesieur & Blume, 1991; Petry, 2003a; Stewart & Brown, 1988). In this study, benefits of GA attendance were less pronounced in the CB conditions in the short term, but by Month 12, GA attendance was associated with abstinence in the sample as a whole. Further, participation in CB therapy was positively and significantly associated with outcomes in both the short and long term, and this effect has been noted in treatment of other disorders as well (Blagys & Hilsenroth, 2002). Greater participation in the CB individual therapy relative to the CB workbook appears responsible for the differences in outcomes between the conditions.

Strengths of this study include the large sample size, one of the largest ever reported for gamblers (NRC, 1999; Petry, 2005a; Toneatto & Ladouceur, 2003), and use of very few exclusion criteria, thereby enhancing generalization of the findings. Reasonable follow-up rates were achieved, and intent-to-treat analyses were used, including as much follow-up data as possible from all participants assigned to a treatment condition. Many therapists provided therapy, reducing the impact of any particular therapist on outcomes. Collaterals corroborated participant reports, and the two were highly concordant.

A weakness of the study was that therapist attention was not controlled across conditions. Future studies will need to evaluate the efficacy of CB therapy in comparison with other types of therapy that equate for common therapeutic processes. Although all participants were referred to GA, referral occurred in a one-time session. Had facilitation processes such as arranging for contacts with an active GA member been included, more participants may-

have become involved in GA. In addition, measures of outcomes in treatment of pathological gambling are debated (NRC, 1999). Multiple gambling outcome measures were assessed, and most showed some degree of concordance in this study. To minimize time burdens on participants, diagnoses of other psychiatric conditions were not made, but comorbidity was likely high (Cunningham-Williams et al., 1998; Ibanez et al., 2001; Petry, 2005a). Although comorbidity may impact outcomes, baseline levels of psychiatric distress were not associated with abstinence in this sample. Finally, results can be generalized only to pathological gamblers who present for treatment. Gamblers who were eligible yet never presented for treatment may have different outcomes than those reported herein.

As awareness of pathological gambling grows (Shaffer & Korn, 2002), more gamblers may begin seeking treatment. Presently, very few health or mental health care providers have experience assessing or treating gambling (according to the National Council on Problem Gambling's Counselor Search; see http://www.ncpgambling.org/resources/resources_counselor.asp). Although the common practice of referral to GA may help some symptoms subside, this CB intervention further improves outcomes. Furthermore, professionally delivered CB therapy increases the probability that patients will engage in the treatment, and it reduces psychiatric symptoms as well. Although future studies will need to evaluate the cost-benefits and cost-effectiveness of this intervention, these data suggest efficacy of this relatively brief, eight-session therapy in decreasing the negative consequences of pathological gambling.

References

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

Apodaca, T. R., & Miller, W. R. (2003). A meta-analysis of the effectiveness of bibliotherapy for alcohol problems. *Journal of Clinical Psychology, 59,* 289–304.

Blagys, M. D., & Hilsenroth, M. J. (2002). Distinctive activities of cognitive-behavioral therapy: A review of the comparative psychotherapy process literature. *Clinical Psychology Review, 22,* 671–706.

Blanco, C., Petkova, E., Ibanez, A., & Saiz-Ruiz, J. (2002). A pilot placebo-controlled study of fluvoxamine for pathological gambling. *Annals of Clinical Psychiatry, 14,* 9–15.

Carroll, K. M., Nich, C., Sifry, R. L., Nuro, K. F., Frankforter, T. L., Ball, S. A., et al. (2000). A general system for evaluating therapist adherence and competence in psychotherapy research in the addictions. *Drug and Alcohol Dependence, 57,* 225–238.

Cunningham-Williams, R. M., Cottler, L. B., Compton, W. M., & Spitznagel, E. L. (1998). Taking changes: Problem gamblers and mental health disorders. Results from the St. Louis Epidemiological Catchment Area (ECA) Study. *American Journal of Public Health, 88,* 1093–1096.

Derogatis, L. R. (1993). *Brief Symptom Inventory.* Baltimore: Clinical Psychometric Research.

Echeburúa, E., Baez, C., & Fernandez-Montalvo, J. (1996). Comparative effectiveness of three therapeutic modalities in the psychological treatment of pathological gambling: Long-term outcome. *Behavioral and Cognitive Psychotherapy, 24,* 51–72.

Gerstein, D. R., 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.

Grant, J. E., Steinberg, M. A., Kim, S.-W., Rounsaville, B. J., & Potenza, M. N. (2004). Preliminary validity and reliability testing of a structured clinical interview for pathological gambling. *Psychiatry Research, 128,* 79–88.

Hedeker, D. H. (1993). MIXREG: A Fortran program for mixed-effects linear regression models [Computer program]. Rockville, MD: National Institute of Mental Health, Division of Services Research.

Hodgins, D. C., Currie, S. R., & el-Guebaly, N. (2001). Motivational enhancement and self-help treatments for problem gambling. *Journal of Consulting Clinical Psychology, 69,* 50–57.

Hodgins, D. C., Makarchuk, K., el-Guebaly, N., & Peden, N. (2002). Why problem gamblers quit gambling: A comparison of methods and samples. *Addiction Research and Theory, 10,* 203–218.

Ibanez, A., Blanco, C., Donahue, E., Lesieur, H. R., Perez de Castro, I., Fernandez-Piqueras, J., & Saiz-Ruiz, J. (2001). Psychiatric comorbidity in pathological gamblers seeking treatment. *American Journal of Psychiatry, 158,* 1733–1735.

Jacobson, N. S., & Truax, P. (1991). Clinical significance: A statistical approach to defining meaningful change in psychotherapy research. *Journal of Consulting and Clinical Psychology, 59,* 12–19.

Kim, S. W., Grant, J. E., Adson, D. E., & Shin, Y. C. (2001). Double-blind naltrexone and placebo comparison study in the treatment of pathological gambling. *Biological Psychiatry, 49,* 914–921.

Ladouceur, R., Jacques, C., Ferland, F., & Giroux, I. (1999). Prevalence of problem gambling: A replication study 7 years later. *Canadian Journal of Psychiatry, 44,* 802–804.

Ladouceur, R., Sylvain, C., Boutin, C., Lachance, S., Doucet, C., & Leblond, J. (2003). Group therapy for pathological gamblers: A cognitive approach. *Behaviour Research and Therapy, 41,* 587–596.

Ladouceur, R., Sylvain, S., Boutin, C., Lachance, S., Doucet, C., Leblond, J., & Jacques, C. (2001). Cognitive treatment of pathological gambling. *Journal of Nervous and Mental Disease, 189,* 774–780.

Lesieur, H. R., & Blume, S. B. (1987). The South Oaks Gambling Screen (The SOGS): A new instrument for the identification of pathological gamblers. *American Journal of Psychiatry, 144,* 1184–1188.

Lesieur, H. R., & Blume, S. B. (1991). Evaluation of patients treated for pathological gambling in a combined alcohol, substance abuse and pathological gambling treatment unit using the Addiction Severity Index. *British Journal of Addiction, 86,* 1017–1028.

López-Viets, V. C., & Miller, W. R. (1997). Treatment approaches for pathological gamblers. *Clinical Psychology Review, 17,* 689–702.

McLellan, A. T., Luborsky, L., Cacciola, J., Griffith, J., McGahan, P., & O'Brien, C. P. (1988). *Guide to the Addiction Severity Index: Background, administration, and field testing results* (DHHS Publication No. ADM 88–1419). Washington, DC: U.S. Government Printing Office.

Monti, P. M., Kadden, R. M., Rohsenow, D. J., Conney, N. L., & Abrams, D. B. (2002). *Treating alcohol dependence: A coping skills training guide* (2nd ed.). New York: Guilford Press.

National Research Council. (1999). *Pathological gambling: A critical review.* Washington, DC: National Academies Press.

Petry, N. M. (1998). *Stopping problem gambling: A self-help manual.* Unpublished manuscript.

Petry, N. M. (2003a). Patterns and correlates of Gamblers Anonymous attendance in pathological gamblers seeking professional treatment. *Addictive Behavior, 27,* 1–14.

Petry, N. M. (2003b). Validity of the Addiction Severity Index in assessing gambling problems. *Journal of Nervous and Mental Disease, 191,* 399–407.

Petry, N. M. (2005a). *Pathological gambling: Etiology, comorbidity and treatments.* Washington, DC: American Psychological Association.

Petry, N. M. (2005b). Stages of change in treatment-seeking gamblers. *Journal of Consulting and Clinical Psychology, 73,* 312–322.

Petry, N. M., & Armentano, C. (1999). Prevalence, assessment, and treatment of pathological gambling: A review. *Psychiatric Services, 50,* 1021–1027.

Room, R., Turner, N. E., & Ialomiteanu, A. (1999). Community effects of the opening of the Niagara casino. *Addiction, 94,* 1449–1466.

Rosenheck, R. A., Neale, M., & Frisman, L. (1995). Issues in estimating the cost of innovative mental health programs. *Psychiatry Quarterly, 66,* 9–31.

Rosenthal, R., & Rosenow, R. L. (1991). *Essentials of behavioral research: Methods and data analysis.* Boston: McGraw-Hill.

Russo, A. M., Taber, J. I., McCormick, R. A., & Ramirez, L. F. (1984). An outcome study of an inpatient treatment program for pathological gamblers. *Hospital and Community Psychiatry, 35,* 823–827.

Shaffer, H. J., Hall, M. N., & Vander Bilt, J. (1999). Estimating the prevalence of disordered gambling behavior in the United States and Canada: A research synthesis. *American Journal of Public Health, 89,* 1369–1376.

Shaffer, H. J., & Korn, D. A. (2002). Gambling and related mental disorders: A public health analysis. *Annual Review of Public Health, 23,* 171–212.

Slutske, W. S., Jackson, K. M., & Sher, K. J. (2003). The natural history of problem gambling from age 18 to 29. *Journal of Abnormal Psychology, 112,* 263–274.

Sobell, L. C., & Sobell, M. B. (1992). Timeline follow-back: A technique for assessing self-reported alcohol consumption. In R. Litten & J. Allen (Eds.), *Measuring alcohol consumption* (pp. 41–71). New York: Humana Press.

Stewart, R. M., & Brown, R. I. F. (1988). An outcome study of Gamblers Anonymous. *British Journal of Psychiatry, 152,* 284–288.

Stinchfield, R. (2002). Reliability, validity, and classification accuracy of the South Oaks Gambling Screen (SOGS). *Addictive Behaviors, 27,* 1–19.

Stinchfield, R., & Winters, K. (1996). *Effectiveness of six state-supported compulsive gambling treatment programs in Minnesota.* St. Paul: Minnesota Department of Human Services, Mental Health Division, Compulsive Gambling Program.

Stout, R. L., Wirtz, R. W., Carbonari, J., & Del Boca, F. K. (1994). Ensuing balanced distribution of prognostic factors in treatment outcome research. *Journal of Studies on Alcohol, 12,* 70–75.

Sylvain, C., Ladouceur, R., & Boisvert, J. M. (1997). Cognitive and behavioral treatment of pathological gambling: A controlled study. *Journal of Consulting and Clinical Psychology, 65,* 727–732.

Taber, J. I., McCormick, R. A., Russo, A. M., Adkins, B. J., & Ramirez,

L. F. (1987). Follow-up of pathological gamblers after treatment. *American Journal of Psychiatry, 144,* 757–761.

Toneatto, T., & Ladouceur, R. (2003). Treatment of pathological gambling: A critical review of the literature. *Psychology of Addictive Behaviors, 17,* 284–292.

Weinstock, J., Whelan, J. P., & Meyers, A. (2004). Behavioral assessment of gambling: An application of the timeline followback method. *Psychological Assessment, 16,* 72–80.

Weisner, C., McLellan, A. T., & Hunkeler, E. N. (2000). Addiction Severity Index data from general membership and treatment samples of HMO members: One case of norming the ASI. *Journal of Substance Abuse Treatment, 19,* 103–109.

Welte, J., Barnes, G., Wieczorek, W., Tidwell, M. C., & Parker, J. (2001). Alcohol and gambling pathology among U.S. adults: Prevalence, demographic patterns and comoridity. *Journal of Studies on Alcohol, 62,* 706–712.