

A Randomized Trial of Brief Interventions for Problem and Pathological Gamblers

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Limited research exists regarding methods for reducing problem gambling. Problem gamblers ($N = 180$) were randomly assigned to assessment only control, 10 min of brief advice, 1 session of motivational enhancement therapy (MET), or 1 session of MET plus 3 sessions of cognitive-behavioral therapy. Gambling was assessed at baseline, at 6 weeks, and at a 9-month follow-up. Relative to assessment only, brief advice was the only condition that significantly decreased gambling between baseline and Week 6, and it was associated with clinically significant reductions in gambling at Month 9. Between Week 6 and Month 9, MET plus cognitive-behavioral therapy evidenced significantly reduced gambling on 1 index compared with the control condition. These results suggest the efficacy of a very brief intervention for reduction of gambling among problem and pathological gamblers who are not actively seeking gambling treatment.

Keywords: gambling, brief interventions, motivational enhancement therapy, cognitive-behavioral therapy, treatment efficacy

About 1% of the population suffers from pathological gambling (Gerstein et al., 1999; Petry, Stinson, & Grant, 2005; Shaffer, Hall, & Vander Bilt, 1999; Welte, Barnes, Wieczorek, Tidwell, & Parker, 2001), and a subthreshold condition, referred to as problem gambling, is even more prevalent. Typically, those who endorse some diagnostic criteria, but not the five criteria required for a diagnosis, are classified as problem gamblers. Up to 5% of the general population (Gerstein et al., 1999; National Research Council [NRC], 1999; Shaffer et al., 1999; Welte et al., 2001) and even higher proportions of some populations, such as substance abusers, suffer from gambling problems. However, few problem or pathological gamblers seek treatment. The National Epidemiological Survey of Alcohol and Related Conditions (Slutske, 2006) found

that only 7%–12% of pathological gamblers, typically those most severely affected, access treatment.

Evaluating interventions for non-treatment-seeking gamblers is important, because problem and pathological gambling are associated with financial problems, psychiatric distress, and poor health. Problem gamblers spend a median of about \$400 per month on gambling, with pathological gamblers typically wagering \$2,000 or more per month (Hodgins, Currie, & el-Guebaly, 2001; Petry, 2003b; Petry et al., 2006). Psychiatric disorders, including mood, anxiety, and substance use disorders (Cunningham-Williams, Cottler, Compton, & Spitznagel, 1998; Petry et al., 2005), occur at high rates among problem and pathological gamblers. In addition, those with even mild-to-moderate gambling problems are more likely to suffer from physical disabilities and some medical problems than are their non-problem-gambling counterparts (Morasco & Petry, 2006; Morasco et al., 2006). Problem gamblers utilize expensive medical services, such as emergency room visits and inpatient hospitalization, at high rates (Morasco et al., 2006).

Brief interventions are widely used in treating some behavioral disorders, and they are typically defined as therapies lasting from 10 min to four sessions. They may be as simple as brief advice from a physician about adverse consequences of a behavior, such as heavy alcohol consumption or smoking. An extensive literature suggests that brief interventions are more effective than no treatment and are often as effective as more extended treatment in reducing alcohol use (Babor, 1994; Bien, Miller, & Tonigan, 1993; Miller et al., 1995). Such interventions are especially efficacious and cost effective for patients with less severe forms of a disorder (i.e., problem drinkers rather than dependent patients; Babor, 1994; Bertholet, Daeppen, Wietlisbach, Fleming, & Burnand, 2005; Cuijpers, Riper, & Lemmers, 2004). The benefits of such interventions have been extended to other conditions, such as reducing onset of major depression and improving quality of life in

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This study and preparation of this article were supported in part by the Patrick and Catherine Weldon Donaghue Medical Research Foundation and by National Institutes of Health Grants R01-MH60417, R01-MH60417-Supp, R01-DA021567, R01-DA13444, R01-DA018883, R01-DA016855, T32-AA07290, P50-AA03510, and P50-DA09241. We thank Yola Ammerman, Anne Doersch, Heather Gay, Cheryl Molina, Betsy Parker, Nicole Reilly, Ronald Kadden, and Karen Steinberg for assistance with this project.

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those with subthreshold depression (Willemse, Smit, Cuijpers, & Tiemens, 2004). Brief interventions may be particularly useful for those who do not specifically seek therapy for a disorder, and they have the advantages of low cost and wide applicability.

Motivational enhancement therapy (MET), another brief intervention, is based upon the transtheoretical model of change (Miller & Rollnick, 2002). This intervention presumes ambivalence about changing behaviors such as drinking or gambling and encourages individuals to identify pros and cons of altering behavior. Hodgins et al. (2001) adapted MET for gambling and randomly assigned 102 individuals with at least moderate gambling problems to a cognitive-behaviorally based, workbook only condition; the same workbook plus a telephone MET intervention; or a wait list control condition. One month after the baseline evaluation, all groups had decreased their gambling relative to their pretreatment rates. A significant beneficial effect of the workbook plus MET condition was noted compared with the wait list condition on amounts wagered, but the workbook only group did not differ from the wait list group. In a 24-month follow-up, Hodgins, Currie, el-Guebaly, and Peden (2004) noted that the workbook plus MET group had lower scores on the South Oaks Gambling Screen (SOGS; Lesieur & Blume, 1987) and gambled less than did those in the workbook only condition.

The workbook in Hodgins et al.'s (2001) study used cognitive-behavioral therapy (CBT). In CBT, symptoms of psychological disorders are viewed as learned behavior patterns that constitute a maladaptive way of coping. These patterns can be altered via cognitive restructuring and behavior modification. CBT teaches patients with substance use disorders to identify and cope with situations that put them at risk for relapse (Kadden, Litt, Cooney, & Busher, 1992; Marlatt & Gordon, 1985). CBT may be particularly promising because of the potential of delayed effects. Studies in populations with substance use disorders find that beneficial effects of CBT emerge in longer term follow-ups, even though CBT may be equally efficacious to other interventions in the short term (Carroll et al., 1994; O'Malley et al., 1996). In the Hodgins et al. (2001) study of CBT for problem gamblers, participants assigned to the wait list condition received treatment a month after randomization, so long-term benefits of the CBT workbook could not be determined.

Several independent groups have described (Blaszczynski & Silove, 1995; Lopez-Viets & Miller, 1997; Petry, 2005a; Sharpe, 2002; Whelan, Steenbergh, & Meyers, 2007) and reported on (Echeburúa, Baez, & Fernandez-Montalvo, 1996; Echeburúa, Fernandez-Montalvo, & Baez, 2000; Ladouceur et al., 2001, 2003; Petry et al., 2006; Sylvain, Ladouceur, & Boisvert, 1997) the efficacy of CBT for pathological gambling. Further, case reports have detailed combinations of MET and CBT for gamblers (e.g., Wulfert, Blanchard, & Martell, 2003).

In this study, we evaluated the efficacy of three brief interventions. A brief advice condition incorporated some aspects of motivational interviewing, including providing personalized feedback about one's gambling along with simple strategies for decreasing it. One session of MET was another condition; it addressed pros and cons of gambling and elicited change statements. A four-session intervention that combined MET and CBT was also evaluated. The initial session was identical to that provided in the MET condition, and the three sessions of CBT were based on those described by Monti, Kadden, Rohsenow, Conney, and Abrams

(2002) and modified by Petry (2005a). Sessions focused on development of skills that would promote alternatives for managing high-risk gambling situations and moods.

Each of the three interventions was compared with an assessment only control condition, as is recommended in initial stages of therapy development for conditions with no known efficacious intervention (Rounsaville, Carroll, & Onken, 2001). Analyses were conducted over the short term (baseline to Week 6) and throughout the rest of the study period (Week 6 to Month 9). We hypothesized that each condition would reduce gambling and related problems over the short term. Given prior evidence of a delayed effect of CBT, we expected that the MET + CBT condition might continue to decrease gambling throughout the follow-up period. Potential prognostic factors associated with clinically significant reductions in gambling at the long-term follow-up, including pretreatment severity of gambling problems, psychiatric symptoms, substance abuse, and medical problems, were also investigated.

Method

Participants

Participants were recruited between 1999 and 2005 via screening efforts, primarily at substance abuse treatment clinics and medical clinics that serve the underprivileged, and with flyers and advertisements.¹ A brief screen consisting of demographic items, recent gambling activities, and the SOGS (Lesieur & Blume, 1987) was administered to all individuals, in waiting rooms when screeners were present or over the telephone for those who had called in response to flyers. Individuals who endorsed at least 3 items on the SOGS, had spent at least \$100 wagering and had gambled on at least four occasions in the past 2 months, and were 18 years or older were invited to participate in the full evaluation, before which written informed consent, approved by the university's Institutional Review Board, was obtained. Exclusion criteria were reading level below fifth grade, past month suicidal intentions or psychotic symptoms, or interest in receiving more intensive gambling treatment than that provided in the study. The consent form clearly indicated that participants would be randomly assigned to one of four conditions, one of which involved assessment only. All potential participants were asked if they wanted to be ensured gambling treatment before randomization, and such individuals were referred to a gambling treatment program. Figure 1 shows flow of participants through the protocol; 180 participants were eligible and were randomized to a treatment condition.

Assessments

Assessments were administered at baseline and 6 weeks and 9 months later. Participants received \$20 in gift certificates for the baseline evaluation, which took about 45 min, and received \$15 for each of the follow-ups, which took about 20 min and could be done in person or by telephone. Typically, the person who conducted the

¹ Although the study was ongoing for over 5 years, the project was conducted on a part-time basis and was contingent upon staff availability, with no single person dedicated to screening and recruitment efforts. Hence, recruitment was intentionally slow.

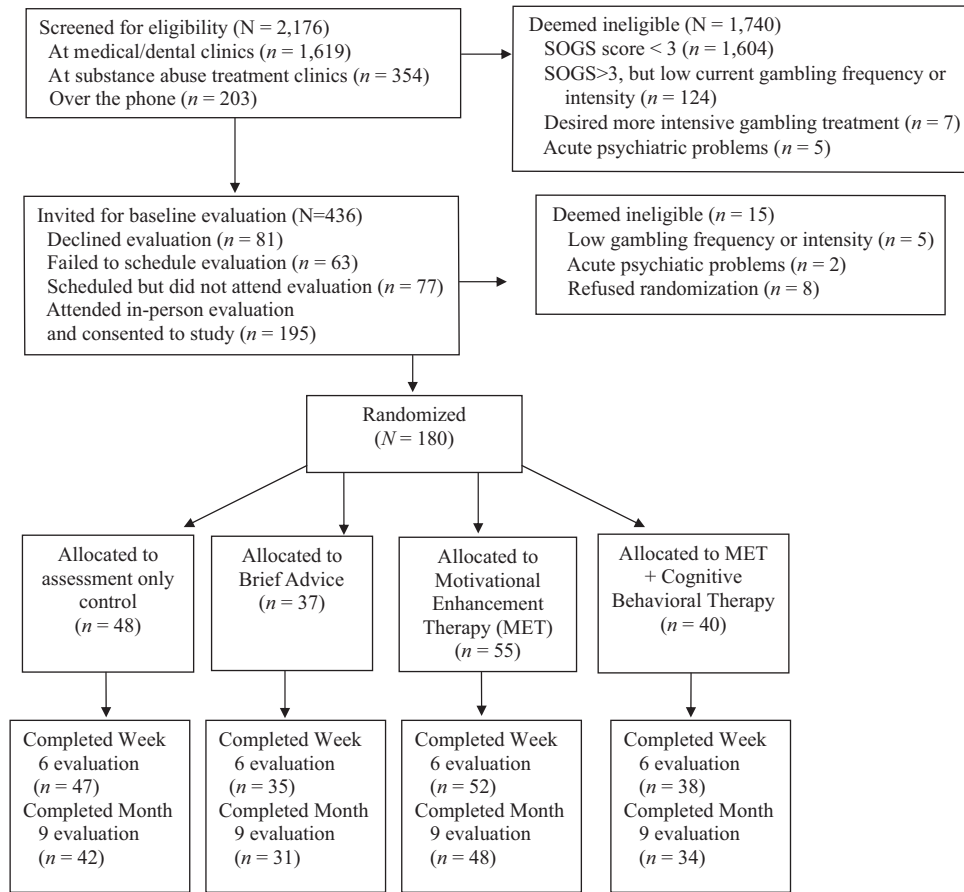


Figure 1. Flow of participants through study protocol. SOGS = South Oaks Gambling Screen.

baseline evaluation also provided the therapy (if so assigned), but 11 research assistants shared responsibilities for administering follow-up evaluations, and the condition to which participants were assigned was not stated on the follow-up forms. Follow-up rates ranged from 83.8% to 97.9% in each condition at every postbaseline evaluation (see Figure 1). No differences in follow-up rates occurred across treatment groups, $\chi^2(3, N = 180) = 1.05$, $p = .79$, for the Week 6 evaluation; $\chi^2(3, N = 180) = 0.35$, $p = .95$, for the Month 9 evaluation. Some postbaseline data were available on all but 4 participants (2.2%).

At baseline only, we used the National Opinion Research Center *DSM-IV* Screen for Gambling Problems (NODS) to assess lifetime pathological gambling with criteria from the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)*; American Psychiatric Association, 1994). The NODS identified 95% of treatment-seeking gamblers as pathological, and test-retest reliability is 0.99 (Gerstein et al., 1999; Hodgins, 2004). In the present sample, Cronbach's alpha was .88.

The Addiction Severity Index (ASI; McLellan et al., 1988) evaluated problems at baseline and follow-up in seven domains commonly affected by addictive disorders, including medical, employment, alcohol, drug, legal, family/social, and psychiatric. Scores range from 0 to 1.0, with higher scores reflecting more severe problems. Psychometric properties are established in substance abusers (McLellan et al., 1988), general medical patients

(Weisner, McLellan, & Hunkeler, 2000), and pathological gamblers (Petry, 2003c, 2007). The ASI has been adapted to include a gambling section that includes questions about dollars wagered (net expenditures) and days gambled in the past month; scoring methods are similar to those for ASI drug scales (Lesieur & Blume, 1991; Petry, 2003c). The ASI—Gambling (ASI-G) section has good internal consistency, test-retest reliability, and validity in assessing gambling problems and changes over time (Lesieur & Blume, 1991; Petry, 2003c, 2007). In 176 treatment-seeking gamblers (Petry et al., 2006), dollars wagered in the past month, as determined by the ASI, were highly correlated with collateral reports of amounts gambled ($r = .68$, $p < .001$). Cronbach's alpha in this sample was .73.

The SOGS (Lesieur & Blume, 1987) examined past-month gambling problems at baseline and through follow-up, with scores of 5 and higher indicative of probable pathological gambling and scores of 3 or higher indicative of problem gambling. SOGS scores are highly correlated with *DSM-IV* criteria and other measures of gambling severity (Hodgins, 2004; Stinchfield, 2002). Gambling treatment studies have utilized SOGS scores as an outcome measure (Hodgins et al., 2004; Petry et al., 2006), and Wulfert et al. (2005) found that shortening the time frame of assessment did not adversely impact psychometric properties. In this sample, Cronbach's alpha ranged from .86 to .88 across the three administration periods. Past-month SOGS scores correlated .72 with ASI-G

scores at baseline, .73 at Week 6, and .80 at Month 9 (all $ps < .001$).

The Brief Symptom Inventory (BSI; Derogatis, 1993) is a reliable and valid 53-item scale that assesses past-week psychiatric symptoms. It was administered at baseline only and provided an overall index of psychiatric severity. A Global Index score was derived, with higher scores indicative of greater severity of symptoms.

The Treatment Service Review (McLellan, Alterman, Cacciola, Metzger, & O'Brien, 1992) evaluated services received, including substance abuse, medical, and professional gambling treatment and self-help (Gamblers Anonymous, GA). Follow-up versions assessed services since the past evaluation.

Randomization to Treatments

From envelopes, participants selected slips of paper that indicated the treatment group to which they were randomly assigned. More envelopes were prepared than participants were randomized, so sample sizes were not equal across groups. Sample size, at about 45 people per group, was estimated from effect sizes of other gambling studies (Hodgins et al., 2001). No stratification variables were used, and blinding participants to conditions was not possible.

Interventions were provided at no cost; participation in sessions was voluntary, and no compensation was provided for attending them. Following treatment delivery (or after a description of follow-up procedures, for those assigned to the assessment only control condition), all participants were instructed to contact research staff if gambling intensified or if they desired additional gambling treatment. None did so. No study-related adverse events occurred.

Assessment only control. After the baseline evaluation had been completed, research assistants informed participants assigned to the assessment only control condition that they would be recontacted for follow-up evaluations in 6 weeks and 9 months.

Brief advice. Participants assigned to this condition met with a research therapist immediately after the evaluation for about 10 min. Using a one-page handout (available in Petry, 2005a), the research therapist described the participant's own level of gambling in relation to that of the general population, outlined risk factors for development of severe gambling problems, and provided four steps with which to curtail development of significant gambling problems. These steps included limiting the amount of money spent when gambling, reducing the amount of time and days spent gambling, not viewing gambling as a way of making money, and spending time doing other activities.

MET. A 50-min MET session was held after the baseline evaluation. Therapists initially provided personalized feedback about participants' gambling. Next, they explored positive and negative consequences of gambling and discussed how gambling fit within participant goals and values. Lastly, participants completed a change plan worksheet.

MET + CBT. Participants assigned to this condition met with a research therapist after the baseline evaluation. They received the same MET session as that described above and were encouraged to return for three sessions of CBT in the subsequent weeks. CBT sessions involved (a) determining internal and external triggers of gambling; (b) discussing methods for coping with internal gam-

bling triggers, such as lonely, depressed, or anxious moods; and (c) developing methods for coping with external gambling triggers, such as assertiveness training, and for coping with gambling cues or cravings. We modified CBT session handouts from those in Petry (2005a) to emphasize reductions in gambling, rather than abstinence, as the goal.

Therapists

Nine therapists (two with bachelor's degrees and seven with master's degrees) delivered all three forms of therapy. They received didactic training and close supervision of at least one case. Ongoing supervision consisted of regular review of therapy notes and audiotapes and of case discussion. Using a modification of the Yale Adherence Competence Scale (Carroll et al., 2000), four individuals rated 37 randomly selected audiotapes for brief advice, MET, and CBT items on a 7-point Likert scale (1 = *none/poor*, 3 = *some/adequate*, 7 = *extensive/exceptional*). An example of a brief advice item is "To what extent did the therapist provide concrete recommendations for reducing gambling?" An example of an MET item is "To what extent were the therapist's questions open-ended and reflective?" An example of a CBT item is "To what extent did the therapist attempt to teach, model, or rehearse specific coping skills (problem solving, coping with craving, social skills)?" Interrater reliability, as assessed by the intraclass correlation coefficient, was .82.

In brief advice sessions, means and standard deviations on brief advice items were 5.25 ± 1.31 (reflecting average rankings of "good/quite a bit"). In contrast, during brief advice sessions, average ratings on MET and CBT items were 1.00 ± 0.00 and 1.05 ± 0.13 , respectively (reflecting average ratings of "none/poor"). In MET sessions, MET adherence items were rated 5.07 ± 1.16 , versus 1.08 ± 0.34 for brief advice items and 1.28 ± 0.76 for CBT items. CBT sessions were rated as 3.32 ± 1.32 for CBT items, 2.21 ± 0.56 for MET items, and 1.00 ± 0.00 for brief advice items. Thus, the therapies were distinguishable ($ps < .05$).

Data Analysis

Analysis of variance and chi-square tests examined baseline differences across groups. Nonnormally distributed data were transformed (e.g., with log transformations for dollars wagered).

Intent-to-treat analyses were conducted. The primary analytic strategy was random-effects 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. All participants had at least baseline data available; these data are included in the analyses. The primary outcome was ASI-G scores. To provide a more intuitive account of gambling behavior, we evaluated dollars wagered in the prior 30 days, as assessed by the ASI, as a secondary outcome measure. Days gambled is a less sensitive index to change, as gambling frequency varies markedly on the basis of preferred forms of gambling (Petry, 2003a), and was found to be less sensitive to change than was dollars gambled in another treatment study (Petry et al., 2006). Further, due to the nature of the sampled individuals, who were not actively seeking gambling treatment, none of the interventions tested in this study were abstinence oriented.

Three contrasts were evaluated, and each compared an active intervention (brief advice, MET, or MET + CBT) with the assessment only condition. In each case, the intervention was assigned a weight of 1 and the control condition 0. Contrast \times Time analyses evaluated if groups differed over time. We conducted analyses (a) from baseline through the 6-week evaluation and (b) from Week 6 throughout the 9-month period to assess any enduring effects.

As an indicator of clinically significant change (Jacobson & Truax, 1991), participants were classified into one of three categories on the basis of their posttreatment SOGS scores and dollars wagered: recovered (SOGS $<$ 3 and a substantial decrease in dollars wagered of $<$ 30% baseline rates, one *SD* below the mean group change); improved (SOGS $<$ 3 or substantial decrease in dollars gambled but not both); or unchanged (SOGS \geq 3 and small or no reduction in gambling amounts; there were no substantial increases in gambling from baseline to Month 9). Mann-Whitney *U* tests evaluated proportions of participants classified into these categories at Week 6 and Month 9 and compared each intervention with the assessment only condition.

Finally, logistic regressions evaluated variables associated with recovered/improved versus unchanged gambling status at Month 9. Gender, age, and baseline Brief Symptom Inventory, SOGS, and ASI alcohol, drug, and medical composite scores were entered in the first step. Gender was a dichotomous variable, and others were continuous. In Step 2, we entered treatment condition, with the control condition indicated as the reference category, to determine if any of the interventions increased the odds of recovered/improved status relative to the assessment only condition. Our analyses included only follow-up completers and then repeated coding noncompleters as having gambled problematically. Significance was set at $p < .05$ (two-tailed); all analyses other than hierarchical linear modeling were conducted with SPSS for Windows.

Results

Sample Description and Treatment Participation

Baseline indices are shown in Table 1. Groups did not differ significantly on any demographic characteristic or on measures of gambling or of gambling problem severity at baseline.

All participants assigned to brief advice received it. Some participants assigned to MET ($n = 3$, 5.5%) and some assigned to MET + CBT ($n = 5$, 12.5%) scheduled their session for another day and failed to attend. In the MET + CBT condition, 13 (32.5%) attended all four sessions, whereas 3 (7.5%) came to three sessions, 5 (12.5%) to two, and 14 (35.0%) to only one (the initial MET session). Conservative intent-to-treat analyses were specified, as interventions may not be particularly useful if a minority of individuals receives them. Thus, all participants assigned to a condition were included in the analyses, regardless of their attendance.

Although no participants requested additional gambling treatment, review of the Treatment Service Review at Week 6 revealed that 3 participants (1 from each of the intervention conditions) had received one professional gambling treatment session or had attended between one and two GA meetings in addition to the therapy they had received in the study. At Month 9, 1 of these individuals (from the MET + CBT condition) had attended an-

other professional gambling treatment session outside the study, and 5 others (1 from the assessment only and 2 each from MET and MET + CBT conditions) either had received professional gambling therapy ($n = 1$) or had attended a GA meeting in the prior 7.5 months ($n = 4$). Because this level of involvement in nonstudy gambling treatment was low ($<$ 5%) and was consistent across groups, all participants were included in the intent-to-treat analyses.

Effects of Interventions on Gambling

Table 2 shows gambling variables over time. Time effects, which indicated general declines in gambling over time, were significant for ASI-G scores between baseline and Week 6 (see middle columns). The Group \times Time interaction that compared the brief advice and control conditions was significant between baseline and Week 6. The brief advice condition evidenced significantly steeper slopes in reductions of ASI-G scores over time (see Figure 2). Similar effects were noted with dollars wagered over time (see Table 2 and Figure 3). The other conditions showed similar declines in gambling to that shown by the assessment only condition between baseline and Week 6.

Table 2 also shows gambling indices between Week 6 and Month 9 (see right columns). The brief advice condition evidenced no further changes compared with the assessment only condition, but both groups continued gambling at lower levels than at baseline during this later assessment point (see Figures 2 and 3). Compared with assessment only participants, the MET + CBT participants had a steeper slope with respect to declines in ASI-G scores between Week 6 and Month 9, but Group \times Time effects were not significant for dollars wagered. As we compared the MET and control conditions, no significant Group \times Time interactions emerged, although the Group \times Time interaction for ASI-G scores approached significance between Week 6 and Month 9.

Clinically Significant Changes in Problem Gambling Status

At Week 6, the percentages (and numbers) of participants classified as recovered, on the basis of SOGS scores and dollars wagered, were 4.3% ($n = 2$ of 47), 20.0% ($n = 7$ of 35), 11.5% ($n = 6$ of 52), and 2.6% ($n = 1$ of 38) in the assessment only, brief advice, MET, and MET + CBT conditions. The respective data for improved participants were 42.6% (20), 45.7% (16), 42.3% (22), and 47.4% (18). Unchanged participants constituted 53.7% (25), 34.3% (12), 46.2% (24), and 50.0% (19) in the respective groups. Only the brief advice group differed significantly from the control group at Week 6 ($U = 613.00$, $p < .03$, effect size [θ] = .37).

By Month 9, the percentages (and numbers) of recovered participants were 14.3% (6 of 42), 25.8% (8 of 31), 14.6% (7 of 48), and 20.6% (7 of 34) in the four respective groups. The data for improved participants were 33.3% (14), 45.2% (14), 43.8% (21), and 38.2% (13). Those participants classified as unchanged from baseline to Month 9 represented 52.4% (22), 29.0% (9), 41.7% (20), and 41.2% (14) of the respective groups. Only the brief advice group differed significantly from the control group ($U = 485.00$, $p < .05$, $\theta = .37$).

Table 1
Demographic and Baseline Characteristics of the Groups

Characteristic	Control	Brief advice	MET	MET + CBT	Statistic	<i>p</i>
<i>N</i>	48	37	55	40		
Age, <i>M</i> (<i>SD</i>)	41.4 (12.5)	43.5 (14.4)	45.0 (13.8)	44.0 (10.2)	$F(3, 178) = 0.69$	.56
Female, no. (%)	15 (31.3)	19 (51.4)	20 (36.4)	18 (45.0)	$\chi^2(3, N = 180) = 4.23$	.24
Ethnicity, no. (%)					$\chi^2(9, N = 180) = 9.09$	.43
African American	10 (21.7)	6 (17.1)	15 (27.8)	10 (25.0)		
European American	28 (60.9)	23 (65.7)	35 (64.8)	24 (60.0)		
Hispanic American	8 (17.4)	6 (17.1)	3 (5.6)	4 (10.0)		
Other	0	0	1 (1.9)	2 (5.0)		
Marital status, no. (%)					$\chi^2(9, N = 180) = 10.66$	.30
Never married	21 (43.8)	19 (51.4)	20 (36.4)	15 (37.5)		
Married/cohabiting	19 (39.6)	9 (24.3)	14 (25.5)	11 (27.5)		
Divorced/separated	8 (16.7)	7 (18.9)	18 (32.7)	13 (32.5)		
Widowed	0	2 (5.4)	3 (5.5)	1 (2.5)		
Income, <i>M</i> (<i>SD</i>)	25,871 (43,000)	23,583 (24,569)	27,277 (27,260)	31,552 (34,527)	$F(3, 178) = 0.37$	.78
Education, <i>M</i> (<i>SD</i>)	12.5 (2.8)	13.5 (2.5)	13.8 (2.5)	13.2 (2.0)	$F(3, 179) = 2.21$	.09
Received in past month, no. (%)						
Substance abuse treatment	23 (47.9)	16 (43.2)	24 (43.6)	20 (50.0)	$\chi^2(3, N = 180) = 0.86$	.84
Medical treatment	25 (52.1)	20 (54.1)	28 (50.9)	20 (50.0)	$\chi^2(3, N = 180) = 0.15$	.99
Addiction Severity Index scores, <i>M</i> (<i>SD</i>)						
Medical	0.27 (0.35)	0.41 (0.37)	0.33 (0.36)	0.26 (0.34)	$F(3, 179) = 1.57$	.20
Employment	0.55 (0.39)	0.52 (0.36)	0.53 (0.36)	0.54 (0.39)	$F(3, 179) = 0.04$	.99
Alcohol	0.11 (0.18)	0.08 (0.12)	0.12 (0.11)	0.07 (0.11)	$F(3, 179) = 1.16$	.33
Drug	0.04 (0.06)	0.03 (0.05)	0.03 (0.06)	0.05 (0.08)	$F(3, 179) = 1.12$	.34
Legal	0.13 (0.22)	0.06 (0.11)	0.08 (0.18)	0.07 (0.14)	$F(3, 179) = 1.24$	.30
Family/social	0.21 (0.23)	0.21 (0.24)	0.21 (0.19)	0.17 (0.17)	$F(3, 179) = 0.46$	.71
Psychiatric	0.17 (0.22)	0.25 (.23)	0.17 (0.18)	0.16 (0.19)	$F(3, 179) = 1.57$	.20
Brief Symptom Inventory, <i>M</i> (<i>SD</i>)	1.8 (0.8)	1.8 (0.7)	1.6 (0.6)	1.6 (0.6)	$F(3, 174) = 1.05$	.37
NODS lifetime score, <i>M</i> (<i>SD</i>)	5.2 (3.1)	5.1 (3.1)	5.5 (3.3)	5.5 (2.5)	$F(3, 179) = 0.19$	.91
Lifetime pathological gambler based on NODS, no. (%)	25 (52.1)	23 (62.2)	32 (58.2)	28 (65.0)	$\chi^2(3, N = 180) = 1.71$	.64
SOGS past-month score, <i>M</i> (<i>SD</i>)	8.9 (5.1)	8.9 (4.7)	9.2 (5.2)	9.1 (4.2)	$F(3, 179) = 0.05$	.98
Past-month probable pathological gambler, based on SOGS, no. (%)	24 (50.0)	19 (51.4)	31 (56.4)	21 (52.5)	$\chi^2(3, N = 180) = 0.46$	.93
Days gambled in past month, <i>M</i> (<i>SD</i>)	19.0 (10.6)	17.5 (11.5)	17.2 (10.1)	16.3 (11.6)	$F(3, 179) = 0.48$	.70
Dollars gambled in past month, <i>Mdn</i> (interquartile range)	500 (1,150)	300 (800)	440 (675)	450 (550)	$\chi^2(3, N = 180) = 7.09$	.07
Preferred gambling, no. (%)					$\chi^2(15, N = 180) = 15.11$	.44
Scratch/lottery	21 (43.8)	17 (45.9)	23 (41.8)	17 (42.5)		
Slot machines	7 (14.6)	6 (16.2)	12 (21.8)	7 (17.5)		
Cards	13 (27.1)	3 (8.1)	8 (14.5)	7 (17.5)		
Sports	6 (12.5)	5 (13.5)	5 (9.1)	4 (10.0)		
Dice	1 (2.1)	5 (13.5)	4 (7.3)	5 (12.5)		
Other	30 (0.0)	81 (2.7)	63 (5.5)	70 (0.0)		

Note. Numbers do not always add up to full sample size because some variables are missing. MET = motivational enhancement therapy; CBT = cognitive-behavioral therapy; NODS = National Opinion Research Center *DSM-IV* Screen for Gambling Problems; SOGS = South Oaks Gambling Screen.

Predictors of Improvement at Month 9

As shown in Table 3, we used logistic regression to examine variables putatively associated with improved/recovered status at the 9-month follow-up. Step 1, with demographics and baseline severity scores included, was significant, $\chi^2(7, N = 149) = 28.84, p < .001$.² Higher baseline SOGS scores and ASI medical scores were significantly and inversely associated with the likelihood of improved/recovered status at Month 9. The inclusion of group assignment in Step 2 was also significant, $\chi^2(3, N = 149) = 9.48, p < .05$, and improved the overall model, $\chi^2(10, N = 149) = 38.32, p < .001$, with 70.5% of the cases correctly identified.

Baseline SOGS scores and baseline ASI medical scores remained significant in the model. Relative to the assessment only group, the brief advice group had a significant positive relationship with improved/recovered status at Month 9. The odds ratio (OR) of 6.08 indicates that those receiving brief advice had a sixfold-increased chance of being improved or recovered at Month 9 relative to

² Although 155 participants completed the 9-month follow-up evaluation, 6 participants had missing values on a baseline demographic characteristic or assessments (e.g., Brief Symptom Inventory) and, therefore, were excluded from the logistic regression analysis.

Table 2
Gambling Outcome Measures and Results From Random Regression Models Analyses

Variable	Outcome measures, raw means (SD)			Baseline through Week 6 <i>T</i> (<i>p</i>)		Week 6 through Month 9 <i>T</i> (<i>p</i>)	
	Baseline (<i>N</i> = 180)	Week 6 (<i>N</i> = 172)	Month 9 (<i>N</i> = 155)	Time	Group × Time	Time	Group × Time
	ASI—Gambling						
Control	0.44 (0.21)	0.34 (0.19)	0.33 (0.24)	−2.49 (<.05)	−2.40 (<.02)	0.36 (.72)	0.34 (.74)
Brief advice	0.44 (0.24)	0.31 (0.31)	0.31 (0.27)				
MET	0.41 (0.22)	0.39 (0.25)	0.31 (0.24)				
MET + CBT	0.40 (0.18)	0.32 (0.19)	0.25 (0.17)				
Dollars gambled ^a							
Control	2.8 (0.6)	2.4 (1.0)	2.1 (1.4)	−2.08 (<.05)	−2.04 (<.05)	−0.28 (.78)	0.43 (.67)
Brief advice	2.5 (0.5)	1.6 (1.4)	1.5 (1.5)				
MET	2.5 (0.7)	2.2 (1.2)	2.0 (1.3)				
MET + CBT	2.6 (0.8)	2.0 (1.0)	1.8 (1.5)				

Note. ASI = Addiction Severity Index; MET = motivational enhancement therapy; CBT = cognitive-behavioral therapy.
^a Dollars gambled were log transformed prior to analyses.

participants in the assessment only control condition. The MET and MET + CBT conditions did not significantly alter odds of being improved or recovered. Gender, age, severity of alcohol or drug problems, and psychological distress levels at baseline were all unrelated to this outcome.

If participants with missing data at Month 9 were coded as gambling problematically (*n*s = 6, 6, 7, and 6 in the four respective groups), results remained similar. The overall model was significant, $\chi^2(10, N = 174) = 31.22, p < .001$; again, baseline SOGS scores (Wald = 8.04, *p* < .005, OR = 0.88, 95% confidence interval [CI] = 0.81–0.96) and ASI medical scores (Wald = 4.64, *p* < .05, OR = 0.31, 95% CI = 0.12–0.91) were significantly inversely associated with improved/recovered status but not with any other baseline characteristics. Only the brief advice condition was significantly associated with improved/recovered status compared with the control condition (Wald = 4.52, *p* < .05), with OR of 2.97 (95% CI = 1.09–8.09) when all participants were included.

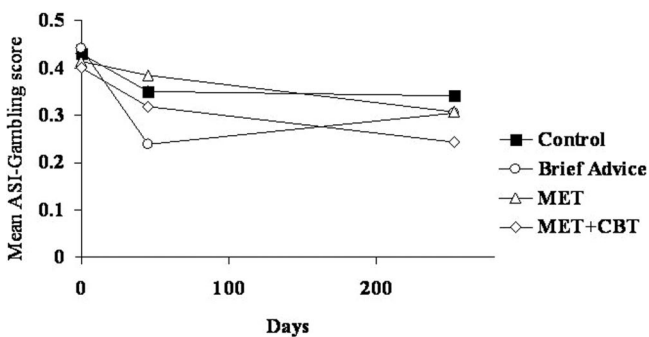


Figure 2. ASI—Gambling scores by days since randomization to a treatment condition. Values represent past-month measures and are estimates from random-effects regression analyses; as such, they do not always match raw means presented in Table 2. ASI = Addiction Severity Index; MET = motivational enhancement therapy; CBT = cognitive-behavioral therapy.

Discussion

Gambling decreased among the majority of participants in this study, even those who were assigned to the assessment only control condition. Significant time effects were noted with respect to ASI-G scores and dollars wagered. Reductions in gambling with no or minimal interventions have also been reported in pharmacological (Grant et al., 2006; Kim, Grant, Adson, & Shin, 2001) and other psychosocial treatment studies of gamblers (Hodgins et al., 2001; Petry et al., 2006). Decreases in gambling are reflected in epidemiological research as well. Lifetime rates of problem and pathological gambling are higher than are past-year rates, despite the fact that few problem or pathological gamblers report seeking treatment for gambling. This fact suggests that many individuals overcome gambling problems on their own (Slutske, 2006). Further, a longitudinal study of non-treatment-seeking adults found that many problem gamblers were no longer experiencing problems 3–4 years later (Slutske, Jackson, & Sher, 2003).

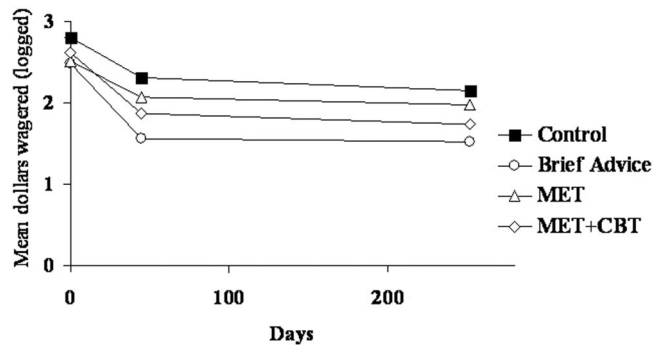


Figure 3. Dollars wagered per month by days since randomization to a treatment condition. Values plotted are log-transformed means. Values represent past-month measures and are estimates from random-effects regression analyses; as such, they do not always match raw means presented in Table 2. MET = motivational enhancement therapy; CBT = cognitive-behavioral therapy.

Table 3
 Logistic Regression Analysis Predicting Recovered/Improved Status at Month 9 (*N* = 149)

	<i>B</i> (<i>SE</i>)	Wald	<i>p</i>	Odds ratio (95% CI)
Step 1				
Female gender	−0.15 (0.38)	0.16	.70	0.86 (0.41, 1.82)
Age	−0.01 (0.02)	0.20	.66	0.99 (0.96, 1.03)
Baseline SOGS	−0.16 (0.05)	9.87	<.01	0.85 (0.77, 0.94)
ASI medical	−1.03 (0.54)	3.72	.05	0.36 (0.13, 1.02)
ASI-alcohol	1.22 (1.50)	0.66	.42	3.38 (0.77, 63.53)
ASI drug	−2.83 (3.20)	0.78	.38	0.06 (0.96, 31.46)
Brief Symptom Inventory	0.00 (.31)	0.00	.99	1.00 (0.41, 1.84)
Step 2				
Female gender	−0.36 (0.41)	0.80	.37	0.70 (0.32, 1.54)
Age	−0.01 (0.02)	0.36	.55	0.99 (0.96, 1.02)
Baseline SOGS	−0.17 (0.05)	10.50	<.001	0.84 (0.76, 0.93)
ASI medical	−1.28 (0.57)	5.11	<.05	0.28 (0.09, 0.84)
ASI alcohol	1.61 (1.64)	0.97	.33	5.01 (0.20, 124.09)
ASI drug	−3.07 (3.36)	0.83	.36	0.05 (0.00, 34.04)
Brief Symptom Inventory	−0.02 (0.33)	0.00	.96	1.02 (0.54, 1.92)
Treatment group		8.52	<.05	
Brief advice	1.81 (0.62)	8.42	<.01	6.08 (1.80, 20.57)
MET	0.86 (0.51)	2.85	.09	2.37 (0.87, 6.43)
MET + CBT	0.78 (0.56)	1.96	.16	2.18 (0.73, 6.49)

Note. CI = confidence interval; SOGS = South Oaks Gambling Screen; ASI = Addiction Severity Index; MET = motivational enhancement therapy; CBT = cognitive-behavioral therapy.

Thus, multiple lines of evidence suggest that gambling problems wax and wane over time, without formal interventions. Motivation to change gambling behaviors may result in reductions in wagering prior to or during initial stages of treatment (Petry, 2005b). In the present study, participation in the baseline evaluation itself may have raised awareness of levels of gambling, which in turn may have increased participant desires to reduce gambling involvement, regardless of which (or whether any) specific intervention was applied.

Although even assessment only participants decreased gambling, benefits of the brief advice condition emerged during the first 6 weeks after treatment. When clinically significant indicators classified participants by both SOGS scores and changes in amounts wagered, the brief advice group differed significantly from the control group at both Week 6 and Month 9. In the logistic regression analysis, having been assigned to the brief advice condition was significantly related to a substantial improvement or recovered status at the most distal follow-up, even after we controlled for baseline characteristics and gambling severity. Thus, the brief advice group evidenced consistent reductions across gambling outcomes.

In contrast to studies on treatment of other disorders (Baer, Kivlahan, Blume, McKnight, & Marlatt, 2001; Carroll et al., 1994; Project MATCH Research Group, 1998), this study found few benefits of the other interventions. MET alone engendered no significant effects on any outcomes, although trends were noted with respect to reductions in ASI-G scores. Availability of the three CBT sessions led to significant improvements on ASI-G scores relative to the assessment condition between Week 6 and Month 9, and these effects were noted with a conservative intent-to-treat analysis. Although MET + CBT did show improvements compared with the control condition on one domain, effects overall were less pronounced than were those obtained with the brief advice.

Of the 40 participants assigned to MET + CBT, 19 did not receive any CBT. Limiting analyses to treatment attendees did not substantially alter results (data not shown; available from Nancy M. Petry), perhaps in part because those who substantially reduced gambling after the baseline assessment may have had little desire to continue with more extended treatment.

Having lower SOGS scores and less severe medical problems at baseline was associated with greater likelihood of improved/recovered status at follow-up. It is not surprising that less severe gambling problems at baseline were related to less severe gambling problems 9 months later. Interestingly, those with greater medical problems at baseline were more likely to be gambling problematically 9 months later. Physical disability and medical problems have been linked to problem gambling in studies of patients who seek medical treatment (Morasco & Petry, 2006; Pasternak & Fleming, 1999) and in epidemiological research (Morasco et al., 2006). The present results extend these findings and suggest that different or more integrated and targeted interventions may be necessary to reduce problem gambling among individuals with poor physical health. In any case, the brief advice condition was efficacious in decreasing gambling, even after we controlled for baseline health and problem gambling severity.

Prior studies have demonstrated that psychiatric symptoms may interact with treatment outcomes, such that more psychiatrically impaired individuals do more poorly in response to gambling treatment (Hodgins, Peden, & Cassidy, 2005). Given the high rates of comorbidity between substance use and gambling disorders (Petry et al., 2005), controversy exists regarding whether specialized interventions are required for dually diagnosed gamblers (Walker et al., 2006). However, in this study, severity of alcohol, drug, and psychiatric problems at baseline was not associated with gambling problems at the follow-up, and nearly half of this sample was recruited from drug abuse treatment programs. Thus, reduc-

tions in gambling achieved with brief advice occurred regardless of severity of baseline problems along these domains.

Strengths of this study included a large sample size, high follow-up rates, and application of intent-to-treat analyses. Many therapists provided the interventions, which reduced the impact of any particular therapist on outcomes. Further, employment of few exclusion criteria enhanced generalization of the findings. The fact that study participants were not actively seeking treatment for gambling made this sample similar to the majority of problem and pathological gamblers in the community, as very few individuals seek treatment for gambling. Both problem and pathological gamblers were included in the study; this study feature was a strength, with respect to external validity, but could be interpreted as a weakness, as more extended therapies than those utilized herein might be necessary for individuals with more severe gambling problems. In any case, these results demonstrate that identification and treatment of individuals via this brief advice can assist in decreasing problem gambling behaviors in a fairly large proportion of gamblers.

A limitation of the study was that therapist attention was not controlled across conditions and that interventions differed not only in contact time but in content. However, this design was intentional, and all interventions were modeled after those interventions with theoretical and empirical support in treatment of related behavioral disorders. Surprisingly few benefits of the more intensive intervention (MET + CBT) were noted, although more than half the participants assigned to this intervention did not receive the full treatment dose. Although adequate, competence of the therapists in CBT delivery was ranked lower than was their delivery of the other interventions, and CBT is rarely designed for such a short-term intervention. Perhaps effects would have been stronger if more sessions had been offered. Nevertheless, in the present study, the brief advice condition engendered benefits similar to those observed for those with other disorders (DeRubeis & Crits-Christoph, 1998). Future studies may dismantle aspects of the brief advice condition to isolate whether personal feedback or specific advice suggestions brought about decreases in gambling.

Another weakness of this study is that it evaluated gambling for only 9 months following randomization. Changes in gambling behavior, either relapses or further reductions, might have occurred later. Additional benefits of MET + CBT might have been uncovered if longer time frames had been evaluated. To minimize time burdens on participants, we did not make diagnoses of other psychiatric conditions, but comorbidity was likely high (Petry et al., 2005). Nevertheless, baseline levels of psychiatric distress were not associated with outcomes in this study.

Across all treatment conditions, scratch and lottery tickets were the most popular form of gambling. In contrast, most treatment-seeking samples in North America prefer electronic gaming machines (e.g., Hodgins et al., 2001; Petry et al., 2006). These discrepancies may relate to differences in recruitment strategies or to the focus on inner-city clinics and nongambling, treatment-seeking individuals, and the results can be generalized only to similar samples.

In addition, measures of gambling outcomes are debated (NRC, 1999; Walker et al., 2006). Several outcome measures were utilized in this study, and most showed some degree of concordance. Although the present study did not include independent confirmation of gambling behaviors, other studies that have done so found

high agreement between self- and collateral reports (Hodgins & Makarchuk, 2003; Petry, 2003b; Petry et al., 2006). If any biases are noted, they are in the direction of participants who reported more frequent and intense gambling than that of which their collaterals were aware. These self-report data are thought to be reliable and valid indicators of gambling, but future studies may include objective or other independent reports of gambling.

As awareness of problem and pathological gambling grows (Shaffer & Korn, 2002), more providers are expressing interest in learning about assessment and treatment of gambling (National Council on Problem Gambling, 2003). Data from this study suggest that screening for gambling problems, especially in high-risk populations such as substance abusers and general medical patients, may uncover fairly high proportions of problem gamblers. A very brief and directive intervention may assist in reducing gambling problems among these individuals.

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Received July 19, 2007
 Revision received October 30, 2007
 Accepted December 17, 2007 ■

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