NIH Public Access
Author Manuscript
*Am J Addict*. Author manuscript; available in PMC 2011 January 5.

Published in final edited form as:
*Am J Addict*. 2009 ; 18(5): 402–408. doi:10.3109/10550490903077861.

# Social support is associated with gambling treatment outcomes in pathological gamblers

**Nancy M. Petry, Ph.D.** and
Calhoun Cardiology Center, Department of Medicine, University of Connecticut School of Medicine, 263 Farmington Avenue, Farmington, CT 06030-3944

**Lindsay M. Weiss**
Department of Psychology, Emory College, Atlanta, GA

## Abstract

Poor social support is a contributory factor in development of addictive disorders, but it has rarely been evaluated in pathological gamblers. This study examined social support in pathological gamblers and its relationship with treatment outcomes. Low baseline social support was associated with increased severity of gambling, family, and psychiatric problems and poorer post-treatment outcomes. Further, social support assessed post-treatment was significantly related to severity of gambling problems at the 12-month follow-up. These findings demonstrate that social support plays an important role in moderating outcomes, and enhancing social support may be an important aspect of effective gambling treatments.

### Keywords

pathological gambling; social support; treatment outcomes

## Introduction

Poor social support is considered a contributory factor in the development of many addictive disorders (1,2), but this construct has rarely been evaluated in pathological gamblers. Individuals without strong and supportive networks of family and friends may be more likely to turn toward addictive behaviors and develop problems with them. Once problems with gambling or substances do develop, those with relatively stronger social support networks may be more likely to seek professional treatment early and benefit from it, as family and friends can be an important factor during the recovery process (1,3–5). In contrast, those with poorer social support networks may have more severe problems, along with more pronounced difficulties along a number of dimensions (3,6). Poor social support may also be a factor in relapse, as negative affect (depressed mood, boredom) is a strong precipitant of gambling episodes among pathological gamblers seeking treatment (7,8) and among substance abusers (9).

Level of social support is inversely related to severity of psychological and physical symptoms (6,10–11). Zimet and colleagues (12) reported that social support was inversely correlated with depression and anxiety symptoms in an undergraduate sample. Similarly, in another study, patients with lower social support had higher symptoms of depression and psychological distress as well as greater severity of alcohol and drug abuse (3). These studies indicate that social support plays an important role in substance abuse and psychiatric symptoms.

NIH-PA Author Manuscript
NIH-PA Author Manuscript
NIH-PA Author Manuscript

NIH-PA Author Manuscript

NIH-PA Author Manuscript

NIH-PA Author Manuscript

Similar to results in substance abuse studies, lower scores on a social support scale were associated with greater severity of gambling problems in a sample of older adult non-treatment-seeking problem gamblers compared to controls (13). In another study (5), greater social support was associated with longer abstinence in treatment-seeking problem gamblers and identified as a strong contributor to one's ability to abstain from gambling. These results suggest that social support may play a role in gambling treatment outcomes. However, this study had several limitations including a small sample size and no control group, and it focused on individuals who were members of Gamblers Anonymous (GA), so results cannot be generalized to other samples of pathological gamblers. Further, some measures did not have established psychometric properties.

Instruments with established psychometric properties that measure social support and treatment outcomes exist and have been more widely applied to alcohol dependent patients. One primary example is the Perceived Social Support Scale (11). This 40-item questionnaire is used to assess social support given by friends and family (14). A shorter version of the questionnaire was also developed containing 14 items (15). Psychometric evaluation of the short version reveals that the internal consistencies related to the Family scale ($\alpha = .84$) and Friends scale ($\alpha = .81$) were acceptable. Test-retest reliability was good for both the Family scale ($r = .94$) and the Friends scale ($r = .88$; 15). In addition, the scale has high concurrent validity (6,10).

Using the Perceived Social Support Scale in an adolescent sample, Windle and Miller-Tutzauer (6) found that lower levels of family support were associated with increased levels of alcohol consumption, cigarette use, alcohol problems, delinquent activity and depressive symptoms. In a sample of individuals with a family history of alcohol dependence, those with low levels of social support from friends were at the greatest risk for developing alcohol problems (16). These results indicate the usefulness of this scale for evaluating the relationship between social support and substance use problems.

The present study aimed to fill in some gaps in the research related to social support and pathological gambling. This study had three primary purposes. The first objective was to compare treatment-seeking pathological gamblers with lower levels of social support versus pathological gamblers with higher levels of social support on indices of problem behaviors. We hypothesized that pathological gamblers with lower levels of social support would differ from pathological gamblers with higher levels of social support on indices of problem behaviors at baseline, especially gambling and psychological problems. We also assessed levels of social support and its association with gambling treatment outcomes. We expected that higher levels of social support measured pre-treatment would be associated with better gambling outcomes post-treatment. Our third hypothesis was that social support would increase during treatment, and greater post-treatment social support would be associated with better long-term outcomes.

## Methods

Participants were 231 individuals included in a randomized clinical trial (17) comparing referral to GA alone versus referral to GA in conjunction with cognitive-behavioral therapy delivered within the context of a workbook or via individual treatment by a professional. Media announcements were used for recruitment purposes, which occurred between 1998 and 2002. Those who were 18 years or older, met current Diagnostic and Statistical Manual for Mental Disorders-IV (18) criteria for pathological gambling using a structured clinical interview (19), had gambled in the past two months, and could read at the 5$^{th}$ grade level (20) were included in the study. Exclusion criteria were current suicidal intention, acute psychotic symptoms, or current involvement in other gambling treatment, and criteria were

NIH-PA Author Manuscript

NIH-PA Author Manuscript

NIH-PA Author Manuscript

minimally restrictive to increase generalizability of the findings. Only 7 individuals who attended the baseline evaluation refused randomization, and 4 were determined ineligible. All participants provided written informed consent, approved by the University's Institutional Review Board.

Because changes in social support are the focus of this report, only the 230 participants who completed the Perceived Social Support Scale at baseline are included in the analyses. Social support data from one participant was missing at baseline.

## Measures and instruments

Assessments were administered at baseline and 2 and 12 months later. Participants received $20 for completing the 2-month evaluation and $15 for the 12-month evaluation. Completion rates were 80.4% for the month 2 and 78.6% for the month 12 evaluations and did not differ across treatment groups or based on baseline characteristics.

The Social Support Scale (15) contained 14 items, with 7 inquiring about social support from family members and 7 asking about social support from friends. Each item was rated on a 1 ("strongly disagree") to 4 ("strongly agree") scale with respect to social support in the prior two months. Four items, two related to family and two related to friends, were posed in the negative direction, such that "strongly agree" responses would indicate poorer support. These items were reverse coded prior to scoring. In this sample, Cronbach's alpha was 0.86 (N=230) and 0.87 (N=211) for the baseline and post-treatment assessments, respectively. Principal components analyses with varimax rotation confirmed that a 2-factor solution best described the data, with one factor containing all the family support items and the other the friend items. A composite score was used in this report, summing ratings across all 14 items (after reverse coding the four items), as no specific hypotheses about types of social support and their relationship to outcomes were proposed.

The Addiction Severity Index (ASI; 21) measures severity of past month gambling, medical, employment, alcohol, drug, legal, family and psychiatric symptoms. Higher scores indicate a greater severity of symptoms. Psychometric properties have been established with substance abusers (21) and gamblers (22). The ASI has been adapted to include a Gambling section, which includes questions and scoring methods similar to ASI-drug scale scores, and contains items related to days and dollars gambled in the past month as well as perceived gambling problems (22–23). The ASI-gambling section has adequate internal consistency, test-retest reliability, and validity in assessing gambling problems and changes in gambling over time (22–24) and was the primary outcome measure in the main trial (23).

Gambling self-reports were verified by collaterals identified by participants. Collaterals 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"), and responses to the latter as dollar amounts. At baseline and follow-ups, Spearman correlations of days and dollars wagered in the past month as reported by participants and collaterals ranged from 0.44 to 0.92, p's<.001 across the treatment groups and evaluations. Mean correlation was 0.62 for frequency and 0.68 for quantity of gambling, p<.001.

## Treatments

After completing the baseline evaluation, research assistants randomly assigned participants to an intervention using a computerized urn randomization procedure (25), which balanced groups on SOGS scores, age, gender, and race.

NIH-PA Author Manuscript

NIH-PA Author Manuscript

NIH-PA Author Manuscript

**Referral to GA alone—**The research evaluator provided a list of local GA meetings and discussed GA with participants for about 10–15 minutes, including their prior attendance, expectations and potential concerns. The evaluator told participants that many people who become involved in GA reduce or stop gambling and encouraged them to select a GA meeting to attend. Participants assigned to this condition did not meet with a therapist as part of the study.

**Referral to GA plus CB therapy via workbook—**Participants in this condition received the same information about GA as noted above. Following the GA referral, participants were given a 70-page workbook, containing CB exercises and a section on dealing with gambling-related debt (26). The workbook contained descriptions and fill-in-the-blank exercises identical to those in the therapy condition (see below). Participants were instructed to complete one chapter a week in the workbook for 8 weeks.

**Referral to GA plus professionally delivered CB therapy—**After GA referral as noted above, participants in this group met individually with a therapist one hour per week for eight weeks. Sessions (31) were structured using handouts and 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. Homework exercises, in addition to the structured in-session handouts, were also provided for use between sessions.

As noted in the main study (17), ten masters- and three doctoral-level therapists delivered therapy at no costs to participants. They received didactic training and close supervision of at least one case; ongoing supervision consisted of review of therapy notes, audiotapes, and case discussion. Using a modification of the Yale Adherence Competence Scale (27), four raters ranked audiotapes for CBT items and items that are not considered CBT-related (i.e., case management) on a 1–7 Likert scale (1=none/poor, 3=some/adequate, 7=extensive/exceptional). Interrater reliability was 0.83. For CBT items, means and standard deviations were 4.3±0.8 (reflecting “good/quite a bit”) versus 1.1±0.3 for items inconsistent with the CBT approach.

Among those assigned to the CBT therapy condition, mean (and standard deviation) number of sessions attended was 5.4±3.1. No differences in GA participation were noted across conditions, Kruskal Wallis $\chi^2$ (2)=1.50, $p$=0.47 for sessions attended at month 2, and $\chi^2$ (2)=0.66, $p$=0.71 at month 12. The median number of GA meetings attended was 0 in all conditions.

## Data analyses

Participants with relatively low and high levels of social support were compared with respect to baseline characteristics and gambling severity. A median split of social support scale scores of 37 was used for classification in the two groups at baseline. Chi-square tests compared groups with respect to categorical variables, and independent t-tests were used for continuous variables. Non-normally distributed variables (e.g., income) were transformed prior to analyses (e.g., using log transformations). Differences between groups with respect to ASI scores were evaluated in a multivariate analysis of variance (MANOVA), with the seven ASI scores included as dependent measures. For ASI scales that differed significantly, responses to individual items were compared between the two groups, using chi-square or t-tests.

Univariate analysis evaluated the effect of baseline levels of social support on gambling outcomes. ASI-gambling scores post-treatment were the dependent measure. Independent

NIH-PA Author Manuscript

NIH-PA Author Manuscript

NIH-PA Author Manuscript

variables were baseline social support and baseline ASI-gambling scores, along with treatment group (a random dummy variable), and analyses were weighted by income (logged).

A repeated measure analysis of variance evaluated changes in social support scale scores between baseline and post-treatment. Treatment group was included as an independent variable, and income (logged) was a covariate. Long-term gambling outcomes were also examined using univariate analysis with ASI-gambling scores at month 12 as the dependent variable. Independent variables were baseline ASI-gambling scores, post-treatment social support scores, and treatment group, with analyses weighted by income (logged).

## Results

### Baseline differences between participants based on level of social support

The demographic characteristics of participants are shown in Table 1 based on the median level of social support at baseline. Total annual income differed between groups; individuals with lower social support had lower annual incomes compared to individuals with higher social support. However, other demographics, treatment condition, and preferred type of gambling did not differ among those with high and low social support. The overall MANCOVA assessing ASI scores differed significantly by social support groups, $F(8,219)=3.22$, $p<.01$, with the gambling, family, and psychiatric subscales differing significantly between those with relatively high and low social support.

Table 2 shows specific items associated with ASI subscales that demonstrated significant differences between those with high and low social support at baseline. For gambling variables, median days and dollars wagered in the past month, number of years gambled, DSM-IV pathological gambling criteria endorsed and SOGS lifetime score were significantly higher among individuals with low relative to high social support, while age at which regular gambling began was significantly lower. Individuals with low social support also evidenced significantly more psychiatric symptoms, both recent and over the lifetime, relative to those with higher levels of social support.

As expected, several family variables also significantly differentiated the groups based on social support scores at baseline. Compared to those with greater social support, those with lower levels of social support had fewer close friends and were more likely to report serious problems getting along with their mothers, partners, and coworkers during the month before entering gambling treatment.

### Effects of baseline social support on gambling outcomes during the treatment period

A univariate analysis including treatment condition and baseline ASI-gambling and social support scores revealed that all three variables significantly predicted post-treatment ASI-gambling scores at month 2. Treatment condition was associated with post-treatment ASI scores, $F(2,174)=3.01$, $p<.05$. Post-hoc tests revealed that the professionally delivered CBT condition had significantly lower scores ($p<.05$, Least significance difference test) than the GA referral alone condition, and none of the other conditions differ significantly from one another, with means and standard errors of $0.47\pm0.04$, $0.43\pm0.03$, and $0.36\pm0.03$ for the GA, workbook, and professionally-delivered CBT conditions, respectively. Baseline ASI-gambling scores were also related to post-treatment scores, $F(1,174)=20.32$, $p<.001$. As shown in Figure 1, even after controlling for these variables along with income, baseline social support scores were significantly associated with post-treatment ASI-gambling scores, $F(1,174)=5.43$, $p<.05$.

NIH-PA Author Manuscript

NIH-PA Author Manuscript

NIH-PA Author Manuscript

### Changes in social support during the treatment period

Post-treatment social support scores were significantly predicted by pre-treatment social support scores, $F(1,202)=143.94$, $p<.001$. Those with baseline social support scores below the median demonstrated increases in scores from pre- to post-treatment, with scores rising from 30.5±4.5 to 33.5±5.7. In contrast, those with scores above the median at baseline showed no change in social support over time with means of 41.7±4.3 before treatment and 41.5±6.0 after treatment. No other variables, including treatment condition or baseline severity of gambling problems, were associated with changes in social support scores over time, p's>0.41.

### Effects of social support on long-term gambling outcomes

ASI-gambling scores at the 12-month follow-up were significantly predicted by post-treatment social support scores, $F(1,172)=6.32$, $p<.02$. Those with post-treatment social support scores below the median of 38 had 12-month follow-up ASI-gambling scores of 0.42±0.27. Those with post-treatment social support scores at or above the median of 38 had lower 12-month follow-up ASI-gambling scores of 0.33±0.24, indicating fewer gambling problems. Baseline ASI-gambling scores were also predictive of month 12 ASI-gambling scores, $F(1,172)=17.56$, $p<.001$, but treatment condition was not, $p>.2$.

## Discussion

This study examined the relationship between social support and pathological gambling. As expected, individuals with lower levels of social support at baseline had greater severity of problems in gambling, psychiatric, and family domains. These results are consistent with prior literature in other addiction populations showing that patients with lower social support had higher symptoms of depression and psychological distress as well as greater severity of addiction problems (1,3,4).

Our findings also show that social support plays an important role in moderating treatment outcomes of pathological gamblers. Baseline social support scores were significantly associated with post-treatment ASI-gambling scores, even after controlling for treatment condition and other variables that distinguished the groups. Those with high levels of social support at baseline demonstrated greater reductions in ASI-gambling scores than those with lower levels of social support at baseline.

These data also revealed that social support increases during treatment for pathological gamblers, especially those with low levels of baseline social support. While participants with relatively high baseline social support demonstrated no further increases in social support, these gamblers may already be at an acceptable level of social support.

Moreover, this study revealed that social support is associated with long-term (12-month) gambling outcomes. Participants who had post-treatment social support scores at or above the median had lower 12-month ASI-gambling scores, indicating fewer gambling related problems at the long-term follow-up. Our findings complement previous studies showing that higher social support in problem gamblers is associated with longer abstinence from gambling (5,28). These results suggest that social support plays a role in moderating gambling behavior.

Strengths of this study include the large sample size and high rates of follow-up achieved. Both participants and collaterals were interviewed regarding participants' gambling behaviors, and reports were highly concordant. A randomized study design was used, and effects of social support on outcomes occurred independent of the type of treatment

NIH-PA Author Manuscript

NIH-PA Author Manuscript

NIH-PA Author Manuscript

administered, suggestive of the global and overreaching importance of social support on gambling treatment outcomes.

Although results from this study demonstrate the importance of social support on changes in gambling problems, they should be interpreted within the context of the study design. These data do not speak to the development of pathological gambling. Whether poor social support preceded the initiation of pathological gambling can only be ascertained from longitudinal studies, and pathological gambling may lead to and/or stem from poor social support. Longitudinal research should be conducted in diverse samples, including non-treatment-seeking gamblers and those with varying severity of gambling problems, to better determine the associations between social support and gambling.

In addition, social support in this study was measured using a single scale. The Social Support Scale (15) assessed support from family and friends as perceived by the patient. However, this study did not attempt to disentangle the types of support that may be more or less related to gambling outcomes. These may include the existence and quality of spousal, children and intergenerational relationships. Therapists may be another important source of social support (29–30), but the association between social support from therapists and outcomes in this study was not assessed as only one-third of patients met with a therapist. Friendships founded in GA may be another source of social support that were not evaluated explicitly in the present trial.

While global levels of social support from family and friends were associated with gambling outcomes, the results of the study do not indicate intuitively the clinical significance of the findings. We analyzed ASI-Gambling scores, as this variable was considered the primary outcome measure in the main trial (17), and it encompasses both days and dollars wagered. The 0.1 difference in ASI-gambling scores post-treatment between groups (0.47 vs. 0.38), for example, represents averages of 5 days and $1,200 dollars wagered in the past month for those with low baseline levels of social support versus 2 days and $200 wagered in the past month for those with high baseline levels of social support. Thus, these group differences do appear to be clinically relevant.

If similar effects are noted in future trials, treatment approaches may include interventions that enhance or extend social support, especially among individuals with low levels of social support. For example, network support treatment (31) is efficacious in treating alcohol dependent patients (32), and contingency management approaches, that reinforce participation in non-addictive activities such as church and community groups (33–34), may also be useful in enhancing levels of social support and improving treatment outcomes.

Psychological characteristics may also interact with social support, and indeed psychiatric symptomology was inversely related to social support in this sample. Nevertheless, psychiatric symptoms were not related to treatment outcomes in this trial (17), while these data show that social support was associated with gambling treatment outcomes. Subsequent research is needed to ascertain whether psychological distress adversely impacts development of social support networks, and if so, how treatments can be improved for pathological gamblers with poor social support and significant psychiatric problems.

In sum, the present findings complement and extend previous research on the relationship between gambling and social support. These data suggest an important role for social support in the treatment of pathological gamblers.

NIH-PA Author Manuscript

NIH-PA Author Manuscript

NIH-PA Author Manuscript

## Acknowledgments

This research and preparation of this report were supported by National Institute on Health grants: R01-MH60417, R01-MH60417-Supp, R01-DA021567, R01-DA13444, R01-DA018883, R01-DA14618, R01-DA016855, R01-DA022739, P50-AA03510, P50-DA09241 and M01RR006192. We thank Yola Ammerman, Heather Gay, Anne Doersch, Cheryl Molina and Drs. Karen Steinberg and Ron Kadden for assistance with conducting the study.

## References

1. Beattie MC, Longabaugh R. General and alcohol-specific social support following treatment. Addic Behav 1999;24:593–606.
2. Fals-Stewart W, O'Farrell TJ. Behavioral family counseling and naltrexone for male opioid-dependent patients. J Consult Clin Psychol 2003;71:432–442. [PubMed: 12795568]
3. Dobkin PL, Civita MD, Paraherakis A, Gill K. The role of functional social support in treatment retention and outcomes among outpatient adult substance abusers. Addiction 2002;97:347–356. [PubMed: 11964111]
4. Havassy BE, Hall SM, Wasserman DA. Social support and relapse: Commonalities among alcoholics, opiate users, and cigarette smokers. Addic Behav 1991;16:235–246.
5. Oei TPS, Gordon LM. Psychosocial factors related to gambling abstinence and relapse in members of gamblers anonymous. J Gambl Stud 2008;24:91–105. [PubMed: 17674163]
6. Windle M, Miller-Tutzauer C. Confirmatory factor analysis and concurrent validity of the perceived social support-family measure among adolescents. J Marr Fam 1992;54:777–787.
7. Morasco BJ, Weinstock J, Ledgerwood DM, Petry NM. Psychological factors that promote and inhibit pathological gambling. Cognit Behav Prac 2007;14:208–217.
8. Weiss LM, Petry NM. Psychometric properties of the inventory of gambling situations with a focus on gender and age differences. J Nerv Ment Dis 2008;196:321–328. [PubMed: 18414127]
9. Annis HM, Graham JM. Profile types on the Inventory of Drinking Situations: Implications for relapse prevention counseling. Psychol Addict Behav 1995;9:176–182.
10. Lyons JS, Perrotta P, Hancher-Kvam S. Perceived social support from family and friends: Measurement across disparate samples. J Pers Assess 1988;51:42–47. [PubMed: 3361411]
11. Procidano ME, Heller K. Measures of perceived social support from friends and from family: Three validation studies. Am J Community Psychol 1983;11:1–24. [PubMed: 6837532]
12. Zimet GD, Dahlem NW, Zimet SG, Farley GK. The multidimensional scale of perceived social support. J Pers Assess 1988;52:30–41.
13. Pietrzak RH, Petry NM. Severity of gambling problems and psychosocial functioning in older adults. J Geriatr Psychiatry Neurol 2006;19:106–113. [PubMed: 16690996]
14. Procidano, ME. The nature of perceived social support: Findings of meta-analytic studies. In: Spielberger, CD.; Butcher, JN., editors. Advances in personality assessment. Hillsdale, NJ: Erlbaum; 1992. p. 1-26.
15. Rice C, Longabaugh R. Measuring general social support in alcoholic patients: Short forms for perceived social support. Psychol Addict Behav 1996;10:104–114.
16. Ohannessian CM, Hesselbrock VM. The influence of perceived social support on the relationship between family history of alcoholism and drinking behaviors. Addiction 1993;88:1651–1658. [PubMed: 8130704]
17. Petry NM, Ammerman Y, Bohl J, Doersch A, Gay H, Kadden R, Molina C, Steinberg K. Cognitive-Behavioral therapy for pathological gamblers. J Consult Clin Psychol 2006a;74:555–567. [PubMed: 16822112]
18. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 4th ed. Washington, DC: American Psychiatric Association; 1994.
19. Grant JE, Steinberg MA, Kim S-W, Rounsaville BJ, Potenza MN. Preliminary validity and reliability testing of a structured clinical interview for pathological gambling. Psychiatry Res 2004;128:79–88. [PubMed: 15450917]
20. Slosson, RL. Slosson Oral Reading Text (SORT)-Revised. East Aurora, NY: Slosson Educational Publications; 1990.

NIH-PA Author Manuscript

NIH-PA Author Manuscript

NIH-PA Author Manuscript


21. McLellan, AT.; Luborsky, L.; Cacciola, J.; Griffith, J.; McGahan, P.; O'Brien, CP. Guide to addiction severity index: Background, administration, and field testing results. Washington, DC: U.S. Government Printing Office; 1988. (DHHS Publication No. ADM 88-1419)
22. Petry NM. Concurrent and predictive validity of the Addiction Severity Index in pathological gamblers. Am J Addict 2007;16:272–282. [PubMed: 17661195]
23. Petry NM. Validity of the Addiction Severity Index in assessing gambling problems. J Nerv Ment Dis 2003;191:399–407. [PubMed: 12826922]
24. Lesieur HR, Blume SB. Evaluation of patients treated for pathological gambling in a combined alcohol, substance abuse and pathological gambling treatment unit using the Addiction Severity Index. Br J Addict 1991;86:1017–1028. [PubMed: 1912747]
25. Stout RL, Wirtz RW, Carbonari J, Del Boca FK. Ensuing balanced distribution of prognostic factors in treatment outcome research. J Stud Alcohol 1994;12:70–75.
26. Petry, NM. Pathological gambling: Etiology, co-morbidity and treatments. Washington, D.C.: American Psychological Association Press; 2005.
27. Carroll KM, Nich C, Sifry RL, Nuro KF, Frankforter TL, Ball SA, et al. A general system for evaluating therapist adherence and competence in psychotherapy research in the addictions. Drug Alcohol Depend 2000;57:225–238. [PubMed: 10661673]
28. Grant JE, Kim S-W, Kuskowski M. Retrospective review of treatment retention in pathological gambling. Compr Psychiatry 2004;45:83–87. [PubMed: 14999657]
29. Meier PS, Barrowclough C, Donmall MC. The role of the therapeutic alliance in the treatment of substance misuse: a critical review of the literature. Addiction 2005;100:304–316. [PubMed: 15733244]
30. Zuroff DC, Blatt SJ. The therapeutic relationship in the brief treatment of depression: contributions to clinical improvement and enhanced adaptive capacities. J Consult Clin Psychol 2006;74(1): 130–140. [PubMed: 16551150]
31. Longabaugh R, Beattie MC. Social investment, environmental support and treatment outcomes of alcoholics. Alcohol Health Res World 1986;10:64–66.
32. Litt MD, Kadden RM, Kabela-Cormier E, Petry NM. Changing network social support for drinking: Initial findings from the network support project. J Consult Clin Psychol 2007;75:542–555. [PubMed: 17663609]
33. Petry NM, Tedford J, Martin B. Reinforcing compliance with non-drug-related activities. J Subst Abuse Treat 2001;20:33–44. [PubMed: 11239726]
34. Petry NM, Alessi SM, Carroll KM, Hanson T, MacKinnon S, Rounsaville B, Sierra S. Contingency management treatments: Reinforcing abstinence versus adherence with goal-related activities. J Consult Clin Psychol 2006b;74:592–601. [PubMed: 16822115]

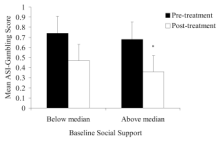


**Figure 1.**

Addiction Severity Index (ASI) Gambling scores for pathological gamblers with baseline Social Support scores above and below the median of 37. Values represent means with y-bars indicating standard deviations. The asterisks indicates that participants with Social Support scores above the median at baseline had statistically significantly greater reductions ($p<.05$) in ASI Gambling scores post-treatment, even after controlling for baseline ASI Gambling scores, treatment group assignment, and income.

NIH-PA Author Manuscript
NIH-PA Author Manuscript
NIH-PA Author Manuscript

NIH-PA Author Manuscript
NIH-PA Author Manuscript
NIH-PA Author Manuscript





*Am J Addict*. Author manuscript; available in PMC 2011 January 5.

**Table 1**

Demographic and baseline characteristics in participants with high versus low social support.

| Variable | Below SS Median (n=107) | Above SS Median (n=123) | *t*, $\chi^2$, *or U* | *df* | *p* |
|---|---|---|---|---|---|
| Age | 43.9 (10.3) | 45.6 (11.3) | t = −1.17 | 228 | 0.24 |
| Male (no., %) | 62 (57.9) | 65 (52.8) | $\chi^2$ = 0.602 | 1 | 0.44 |
| Ethnicity (no., %) | | | $\chi^2$ = 1.51 | 4 | 0.83 |
| White | 90 (84.1) | 104 (84.6) | | | |
| African American | 9 (8.4) | 11 (8.9) | | | |
| Hispanic | 6 (5.6) | 4 (3.3) | | | |
| Asian | 1 (0.9) | 1 (0.8) | | | |
| Other | 1 (0.9) | 3 (2.4) | | | |
| Marital status (no., %) | | | $\chi^2$ = 1.19 | 3 | 0.76 |
| Single | 32 (29.9) | 34 (27.6) | | | |
| Married | 46 (43.0) | 48 (39.0) | | | |
| Widowed | 4 (3.7) | 7 (5.7) | | | |
| Divorced | 25 (23.4) | 34 (27.6) | | | |
| Therapy condition (no.,%) | | | $\chi^2$ = 1.24 | 2 | 0.54 |
| Gamblers Anonymous | 28 (26.2) | 34 (27.6) | | | |
| CBT Workbook | 43 (40.2) | 41 (33.3) | | | |
| CBT | 36 (33.6) | 48 (39.0) | | | |
| Annual income *(IQR)**[a] | $30,000 (35,000) | $40,000 (36,000) | U=5,369 | | <0.05 |
| Preferred type of gambling (no.,%) | | | $\chi^2$ = 4.72 | 6 | 0.58 |
| Animals | 8 (7.5) | 8 (6.5) | | | |
| Cards | 17 (15.9) | 14 (11.4) | | | |
| Dice, craps | 11 (10.3) | 6 (4.9) | | | |
| Scratch | 17 (15.9) | 14 (11.4) | | | |
| Slots | 40 (37.4) | 51 (41.5) | | | |
| Sports | 10 (9.3) | 11 (8.9) | | | |
| Other | 4 (3.7) | 6 (4.9) | | | |
| Addiction Severity Index Scores | | | | | |

NIH-PA Author Manuscript
NIH-PA Author Manuscript
NIH-PA Author Manuscript



| Variable | Below SS Median (n=107) | Above SS Median (n=123) | *t, $\chi^2$, or U* | *df* | *p* |
|---|---|---|---|---|---|
| Medical Score | 0.35 (0.33) | 0.30 (0.34) | F= 0.94 | 1 | 0.33 |
| Employment Score | 0.27 (0.24) | 0.23 (0.25) | F = 1.78 | 1 | 0.18 |
| Gambling Score* | 0.74 (0.17) | 0.68 (0.23) | F = 4.96 | 1 | <0.05 |
| Alcohol Score | 0.09 (0.18) | 0.07 (0.11) | F = 0.95 | 1 | 0.33 |
| Drug Score | 0.02 (0.09) | 0.02 (0.05) | F = 0.25 | 1 | 0.62 |
| Legal Score | 0.08 (0.18) | 0.04 (0.13) | F = 3.13 | 1 | 0.08 |
| Family Score* | 0.32 (0.21) | 0.22 (0.22) | F = 11.36 | 1 | <0.01 |
| Psychiatric Score* | 0.37 (0.19) | 0.26 (0.21) | F = 16.43 | 1 | <0.001 |

*Groups differ, p<.05.

Values represent means (and standard deviations in parentheses) unless otherwise noted.

[a]Values were log transformed prior to analyses

SS=Social Support Scale; IQR = Interquartile Range; CBT = Cognitive-behavioral therapy

NIH-PA Author Manuscript
NIH-PA Author Manuscript
NIH-PA Author Manuscript





*Am J Addict*. Author manuscript; available in PMC 2011 January 5.

**Table 2**

Gambling, psychiatric and family variables in participants with high versus low social support.

| Measure | Below SS Median (n=107) | Above SS Median (n=123) | $X^2$ or *t* | *df* | *p* |
|---|---|---|---|---|---|
| **Gambling Variables** | | | | | |
| Median days gambled in past month (IQR)*[a] | 14.0 (20.0) | 12.0 (15.0) | t = 2.03 | 227 | <0.05 |
| Median dollars wagered in past month (IQR)*[a] | 1425.0 (4400.0) | 1100.0 (2600.0) | t =2.32 | 228 | <0.05 |
| Number of years gambled* | 12.0 (11.2) | 8.6 (8.6) | t = 2.58 | 226 | <0.05 |
| Current gambling debt (dollars) [a] | 20,373 (50,309) | 17,540 (51,801) | t = .40 | 227 | 0.69 |
| DSM-IV pathological gambling criteria endorsed* | 7.6 (1.8) | 7.1 (1.6) | t = 2.02 | 228 | <0.05 |
| SOGS Lifetime Score* | 13.2(3.4) | 12.0 (3.4) | t = 2.63 | 228 | <0.01 |
| Age when first gambled | 19.7 (10.2) | 20.8 (14.1) | t = −7.33 | 228 | 0.46 |
| Age began gambling regularly* | 28.2 (13.6) | 32.2 (14.1) | t = 2.18 | 228 | <0.05 |
| **Psychiatric Variables** | | | | | |
| Days in past month with psychiatric symptoms* | 13.1 (12.3) | 8.8 (11.3) | t = 2.73 | 228 | <0.01 |
| Experienced in past month: | | | | | |
| serious depression (no., %)* | 69 (64.5) | 48 (39.0) | $\chi^2$ = 14.84 | 1 | <0.001 |
| serious anxiety (no., %)* | 78 (72.9) | 68 (55.3) | $\chi^2$ = 7.66 | 1 | <0.01 |
| serious trouble understanding, concentrating (no., %)* | 54 (50.5) | 38 (30.9) | $\chi^2$ = 9.13 | 1 | <0.01 |
| Experienced in lifetime: | | | | | |
| serious suicidality (no., %)* | 54 (50.5) | 29 (23.6) | $\chi^2$ = 17.94 | 1 | <0.001 |
| attempted suicide (no., %)* | 33 (30.8) | 15 (12.2) | $\chi^2$ = 12.05 | 1 | <0.01 |
| **Family Variables** | | | | | |
| Number of close friends* | 2.2 (2.2) | 3.7 (3.6) | t = −3.80 | 229 | <0.001 |
| Days of serious conflict with family members in past month | 2.8 (5.1) | 2.3 (6.3) | t = 0.64 | 228 | 0.52 |
| In past month, experienced serious problems with: | | | | | |

NIH-PA Author Manuscript
NIH-PA Author Manuscript
NIH-PA Author Manuscript



| Measure | Below SS Median (n=107) | Above SS Median (n=123) | $X^2$ or *t* | *df* | *p* |
|---|---|---|---|---|---|
| mother (no., %)* | 19 (18.1) | 7 (5.9) | $\chi^2 = 8.11$ | 1 | <0.01 |
| father (no., %) | 10 (9.6) | 8 (6.8) | $\chi^2 = 0.57$ | 1 | 0.45 |
| partner (no., %)* | 33 (35.9) | 25 (23.1) | $\chi^2 = 3.91$ | 1 | <0.05 |
| coworkers (no., %)* | 14 (13.5) | 5 (4.1) | $\chi^2 = 6.30$ | 1 | <0.05 |

*Groups differ, p<.05.

Values represent means (and standard errors in parentheses) unless otherwise noted.

[a]Values were log transformed prior to analyses

SS=Social Support Scale; DSM-IV = The Diagnostic and Statistical Manual of Mental Disorders (fourth edition); IQR = Interquartile Range; SOGS = South Oaks Gambling Screen