

Determinants of 12-step group affiliation and moderators of the affiliation–abstinence relationship

Christine Timko*, Rachel Billow, Anna DeBenedetti

*Center for Health Care Evaluation, Department of Veterans Affairs Health Care System, and Stanford University Medical Center,
VA Health Care System, 795 Willow Road (152-MPD), Menlo Park, CA 94025, USA*

Received 8 July 2005; received in revised form 27 October 2005; accepted 1 November 2005

Abstract

This study examined characteristics of substance use disorder (SUD) outpatients at intake to treatment ($N=345$) that were associated with more 12-step group attendance and involvement, Steps worked, and acceptance of 12-step philosophy at a 6-month follow-up ($N=281$, 81.4%). Patient characteristics covered the domains of sociodemographics, SUD severity, personal functioning, and previous help received. Distinguishing baseline characteristics of patients who attended more 12-step group meetings during follow-up were being less-educated, more engaged in religious practices, and more extroverted and interpersonally competent, and having had more previous 12-step group exposure. These patient characteristics were generally similar to those associated with more 12-step meeting involvement and philosophy acceptance. More 12-step meeting attendance and involvement were related to abstinence at 6 months. Associations of attendance with abstinence were stronger among patients who were younger, white, less-educated, unstably employed, less religious, and less interpersonally skilled. These patients may have had fewer available social resources and so benefitted more from the fellowship and support for abstinence that 12-step group members often provide. We suggest methods by which treatment providers may encourage 12-step group affiliation among patients likely to benefit from it on substance use outcomes.

© 2005 Elsevier Ireland Ltd. All rights reserved.

Keywords: Substance use disorder; 12-Step groups; Abstinence; Moderators

1. Introduction

Studies clearly demonstrate that substance use disorder (SUD) patients who choose to attend 12-step self-help groups (SHGs) after formal treatment are more likely than those who do not to maintain abstinence, and that more 12-step group affiliation is associated with more improvement on SUD outcomes (Christo and Franey, 1995; Fiorentine, 1999; Ouimette et al., 1999). However, 12-step affiliation is a complex phenomenon with cognitive and behavioral features and is best assessed with measures tapping its different elements (Cloud et al., 2004; Kingree, 1997; Morgenstern et al., 2002). Recognition of the need to assess different aspects of 12-step affiliation (also known as 12-step dose or participation) has evolved, and consensus has grown based on conceptual and empirical grounds on the important and distinct aspects.

In support of the conclusion that 12-step dose is not fully estimated by meeting attendance (Emrick et al., 1993), some studies found that measures of 12-step involvement and agreement with 12-step philosophy predicted outcomes somewhat better than 12-step attendance did (Montgomery et al., 1995; Snow et al., 1994). Individuals who are attending 12-step SHGs may have difficulty embracing other key aspects of self-help that aid recovery (Caldwell and Cutter, 1998). Project MATCH analyses found that three aspects of Alcoholics Anonymous (AA) affiliation — number of meetings attended, number of steps worked, and self-identification as an AA member — best predicted fewer drinking days (Cloud et al., 2004). Taken together, the body of research on 12-step SHG affiliation indicates that the important (predictive of SUD outcome) components are meeting attendance, group involvement (engagement in 12-step practices such as doing service or having a sponsor), working the steps, and believing in 12-step principles (e.g., that addiction is a disease) (Gilbert, 1991; Kingree, 1997; Tonigan et al., 1996, 1998). Composite scores based on combinations of these components have been criticized as difficult to interpret and not well suited for provid-

* Corresponding author. Tel.: +1 650 493 5000x23336; fax: +1 650 617 2736.
E-mail address: ctimko@stanford.edu (C. Timko).

ing clear clinical or practical insight into the level of affiliation, because different aspects of 12-step participation may be differentially related to outcome (Cloud et al., 2004; Morgenstern et al., 2002).

In this prospective study, we examined characteristics of SUD outpatients that were associated with more attendance, involvement, Step work, and acceptance of 12-step philosophy. Determining who is less or more likely to attend and become involved in 12-step groups, and to work the steps and accept 12-step philosophy, will help tailor interventions designed to facilitate 12-step SHG participation for specific patient subpopulations. We examined four domains of patient characteristics associated with each aspect of 12-step affiliation: sociodemographics, severity of SUDs, personal functioning, and help received. We also examined the extent to which these patient characteristics were moderators of associations between 12-step SHG affiliation and better SUD outcomes.

1.1. Who attends 12-step groups during and after treatment?

SUD clients who had the sociodemographic characteristics of older age, higher socioeconomic status, being unmarried, and having less education were more likely to attend AA or Narcotics Anonymous (NA) meetings (Christo and Franey, 1995; Harris et al., 2003) and to sustain AA attendance (Boscarino, 1980; Galaif and Sussman, 1995). Although high proportions of African-American and Hispanic individuals recommend AA affiliation for alcohol-related problems (Caetano, 1993), most AA members in the United States are Caucasian. Accordingly, Galaif and Sussman (1995) hypothesized that 12-step groups are less likely to appeal to ethnic/racial minority individuals. In keeping with this hypothesis, Hispanic alcoholic clients attended AA less frequently than did white clients (Arroyo et al., 1998; Tonigan et al., 1998). In contrast, Humphreys and Moos (1996) found no differences according to ethnicity or race as to whether alcoholic clients selected AA or outpatient treatment for help.

Studies have also investigated associations between SUD severity or personal functioning and 12-step SHG attendance. On the whole, studies reported that participants with more long-term and severe SUD problems were more likely to attend 12-step SHGs, to attend frequently, and to sustain attendance (Brown et al., 2001; Christo and Franey, 1995; Connors et al., 2001; Galaif and Sussman, 1995; Harris et al., 2003). With regard to personal functioning, individuals who are more attuned to interpersonal relationships may be more likely to attend 12-step SHGs, perhaps due to the groups' structure of openly sharing personal details. Individuals with sustained AA attendance were described as being extroverted and comfortable with a high level of self-disclosure (Galaif and Sussman, 1995; Hurlburt et al., 1984).

Despite the strong emphasis in 12-step groups on spiritual beliefs and practices, findings are mixed about the importance of such beliefs in predicting 12-step attendance. Among treated SUD clients, stronger spiritual beliefs predicted a greater likelihood of NA attendance (Christo and Franey, 1995), and long-

term AA members were more religious than nonmembers or short-term members (Galaif and Sussman, 1995). Similarly, clients self-labeled as spiritual and religious were more likely than atheist and agnostic clients to initiate AA attendance and attended AA more often throughout a 1-year post-treatment follow-up (Tonigan et al., 2002). In contrast, clients' beliefs in the existence of God did not predict AA attendance during the year after treatment (Winzelberg and Humphreys, 1999), and religiosity did not predict frequency of 12-step SHG attendance (Brown et al., 2001).

Limited evidence suggests that previous help received for a SUD is associated with 12-step SHG attendance. Clients beginning a treatment episode for SUDs who already had more prior professional treatment were more likely to attend AA and NA (Christo and Franey, 1995; Kaskutas et al., 1999). Having more treatment experiences was associated with more frequent 12-step SHG attendance (Brown et al., 2001).

1.2. Who is involved in 12-step groups?

Fewer studies have examined personal determinants of 12-step group involvement than of meeting attendance. To our knowledge, there are no studies of associations between severity of addiction problems, personal functioning, or previous help experiences and 12-step SHG involvement. With regard to individuals' sociodemographic characteristics, older clients were more involved with AA (Pagano et al., 2004) when involvement was assessed by helping others (e.g., having been a sponsor). African-American clients beginning a treatment episode were more likely than Caucasian clients to say they felt like a member of AA, had done service at an AA meeting, and had experienced a spiritual awakening as a result of AA, but were less likely to have a sponsor and to have read 12-step literature (Kaskutas et al., 1999). African-American and better-educated clients were more comfortable sharing at 12-step meetings (Kingree, 1997).

Tonigan et al. (1998) found that although, as noted, Hispanic clients with alcohol use disorders attended AA less often than did white clients, Hispanic clients were more involved with AA (had and were a sponsor, celebrated AA birthdays). That is, for Hispanic individuals who elected to attend AA, the program's practices were accepted and adopted. Thus, clients in a subgroup that has a lower likelihood of 12-step SHG attendance are not necessarily less involved when they do attend.

1.3. Who works the 12 steps?

Despite the importance given to working the steps in 12-step SHGs, surprisingly little research has examined personal characteristics associated with step work. Older persons worked more steps (Kingree, 1997; Zemore and Kaskutas, 2004) and were more likely to work Step 12, which encompasses carrying the 12-step message to others (Pagano et al., 2004). Having interpersonal communication skills facilitated performing steps 4 and 5, which formalize processes of self-appraisal and -disclosure to other people (Anderson and Gilbert, 1989).

1.4. Who accepts 12-step philosophy?

Accepting 12-step philosophy refers to believing in 12-step principles and the approach to recovery conveyed by 12-step SHGs (e.g., believing in one's powerlessness over substance use, being committed to lifelong abstinence). We know of no studies examining sociodemographic characteristics, severity of addiction, or personal functioning as predictors of 12-step belief endorsement. Regarding previous help, SUD clients with greater numbers of prior treatment episodes were more likely to view addiction as a disease (Christo and Franey, 1995).

1.5. Do personal characteristics moderate associations of 12-step affiliation with abstinence?

We examined the possibility that more 12-step SHG affiliation would have a stronger association with abstinence among individuals with particular characteristics. A better fit between patient characteristics and 12-step SHGs may enhance the benefits of group attendance and involvement (Mankowski et al., 2001). Few studies have looked at this issue. More 12-step affiliation was strongly related to better treatment outcomes among individuals without cognitive impairment, who tend to be younger, but the relationship was weak among individuals who were cognitively impaired and tend to be older (Morgenstern and Bates, 1999). Age-related cognitive impairment may predict poor response to help because it interferes with the learning necessary for behavior change (Morgenstern and Bates, 1999).

Among African-American patients in 12-step facilitation SUD treatment, those who reported religious beliefs at intake were more likely to achieve abstinence than were patients without religious beliefs (Maude-Griffin et al., 1998). SUD clients with more severe substance use and psychosocial problems had higher abstinence rates when they affiliated more with SHGs, whereas the relationship between affiliation and abstinence was weak for those with less severe problems (Morgenstern et al., 1998, 2003). Clients with more severe problems may be less able to rely on their own resources to attain good outcomes, but may benefit from the direction and support in SHGs.

In summary, we examined patients' sociodemographic characteristics, severity of disorder, personal functioning, and previous help received as predictors of more 12-step SHG attendance and involvement, and more working of the steps and acceptance of 12-step philosophy. Based on the literature, we expected to find more attendance among older, single, less-educated, and white individuals with more severe SUDs who were more interpersonally and religiously oriented and had received treatment before. We also expected more 12-step SHG involvement among older and, possibly, more educated individuals, but were reluctant to make predictions based on other personal characteristics due to disparate (e.g., for ethnicity and race) or nonexistent findings. Similarly, although we expected older individuals to work more steps, and more religiously oriented individuals to be more accepting of 12-step principles, previous studies were not sufficient to guide additional predictions.

Patients were assessed at the start of outpatient SUD treatment and followed for 6 months. After investigating whether more 12-step affiliation (i.e., attendance, involvement, step work, acceptance of philosophy) was associated with abstinence, we also examined the extent to which patients' sociodemographics, SUD severity, personal functioning, and previous help moderated associations between affiliation and abstinence. Extrapolating from Morgenstern et al.'s (1998), Morgenstern et al.'s (1999) and Morgenstern et al.'s (2003) findings, we hypothesized that patients with fewer sociodemographic and personal resources would benefit more from 12-step affiliation than would their counterparts with more resources.

2. Methods

2.1. Sample

A total of 382 consecutive patients entering SUD outpatient treatment at Department of Veterans Affairs programs were eligible for the study (i.e., were clinically judged by program staff to be cognitively able to understand the study's questionnaire and interview procedures). After receiving an introduction to the study, 345 patients signed an informed consent form and were enrolled. A total of 37 patients who were eligible for the project declined to participate.

Of the sample, 98% were male, 43% were Caucasian, and 13% were married. On average, participants were 50 years old, had 13 years of education, and had worked only 1.7 days in the past month. At intake, patients' substances of choice were: alcohol (45.9% of the sample); cocaine (36.0%); amphetamines (8.1%); cannabis (21.9%); heroin (7.2%); methadone (7.5%); other opiates or analgesics (7.2%); sedatives, hypnotics, or tranquilizers (4.5%); or barbiturates (0.6%). Fully 41.6% of patients were using more than one of these substances.

2.2. Procedure

Baseline self-report data were collected from study participants at treatment intake. These data included sociodemographics, SUD severity, personal functioning, and previous self-help and formal treatment utilization for SUDs. Patients were reinterviewed 6 months later ($N=281$) to determine the extent of their 12-step group attendance and involvement, step work, acceptance of 12-step philosophy, and current substance use.

2.3. Baseline measures

2.3.1. Sociodemographics. Sociodemographic information covered patients' age, race and ethnicity, marital status, education, employment, income, and residential stability.

2.3.2. SUD severity. The Addiction Severity Index (ASI) (McLellan et al., 1980, 1985a,b) was used to collect information on the severity of patients' substance use. The ASI is a structured, 40 min clinical research interview that assesses seven problem areas, two of which address substance use: alcohol use (at base-

line, mean = 0.299, SD = 0.285) and drug use (mean = 0.118, SD = 0.119). ASI composite scores are produced from sets of objective items that are standardized and summed; they provide internally consistent evaluations of patient status in the problem areas (McKay et al., 1994). ASI composites range from 0 to 1, with higher scores indicating more severe problems.

2.3.3. Personal functioning. Participants were asked if they had a *religious preference* (yes/no). To assess *religious practices*, patients completed the 13-item religious background and beliefs questionnaire (Connors et al., 1996). Patients noted how often during the past year (on a 4-point scale from 1 = rarely or never, to 4 = almost daily or more) they engaged in religious practices such as thinking about God, praying, and meditating. Items were summed (Cronbach's alpha = 0.91). In Project MATCH, this measure had good internal consistency, test–retest reliability, and validity (Connors et al., 1996).

To measure *extroversion*, patients completed the 12-item extroversion subscale of the NEO Five-Factor Inventory (NEO FFI; Costa and McCrae, 1985). Items (e.g., I like to have a lot of people around me) were rated on a 5-point scale from 1 = strongly disagree, to 5 = strongly agree, and summed (alpha = 0.78). The NEO FFI had good internal consistency, test–retest reliability, and validity when used with cigarette smokers, individuals at high risk of substance abuse, and inpatients and outpatients with SUDs (Ball et al., 2001; Bottlender and Soyka, 2005; Kikuchi et al., 1999; Martin and Sher, 1994; Reno, 2004; Yoshimura, 2000).

Patients completed the portions of the interpersonal competence questionnaire (ICQ; Buhrmester et al., 1988) that assess relationship initiation (e.g., carrying on conversations with someone new; alpha = 0.90), personal disclosure (e.g., revealing something intimate about yourself with someone you're just getting to know; alpha = 0.86), and providing emotional support and advice (e.g., helping a close friend get to the heart of a problem; alpha = 0.90). For each domain, eight items (rated on a 4-point scale from 1 = I am poor at this, to 4 = I am extremely good at this) were averaged. Intercorrelations of the baseline predictors in the sociodemographic, severity, personal functioning, and help domains showed, however, that the three portions of the ICQ were highly related to each other (i.e., $r_s > 0.50$). Therefore, we used only the subscale assessing *relationship initiation* competence. Construct validity, internal consistency, and test–retest correlations for this subscale were high among community-residing adults (Buhrmester et al., 1988), driving-while-intoxicated offenders (Wieczorek and Miller, 1992), and mental health outpatients (Semple et al., 1999).

2.3.4. Previous self-help and formal treatment utilization. At baseline, participants were asked how many 12-step group meetings they had ever attended, and how many times in their life they had been treated for alcohol and/or drug misuse.

2.4. Six-month follow-up measures

2.4.1. 12-step SHG attendance and involvement. To measure 12-step SHG attendance and involvement, we used the AA affil-

iation scale (AAAS; Humphreys et al., 1998). Regarding 12-step group attendance, participants were asked for the total number of meetings they had attended during the past 6 months. Regarding 12-step group involvement, participants were asked if they had, for example, done service at a meeting (e.g., helped newcomers, set up chairs, made coffee, cleaned up afterwards). Overall Involvement was the sum of "yes" responses to five such items. The AAAS has demonstrated utility and validity across sociodemographically diverse groups and across patients in different health care ownership systems and in different levels of care (Humphreys et al., 1998). In addition, there is support for the reliability and validity of self-reports regarding participation in 12-step groups (Morgenstern et al., 1997; Tonigan et al., 2002).

2.4.2. Working the steps and accepting 12-step philosophy. Participants were asked how many of the 12 steps they had worked. To assess patients' acceptance of the 12-step model of addiction and recovery, we combined subscales of the addiction treatment attitudes questionnaire (ATAQ; Morgenstern et al., 2002): *belief in having a disease called addiction* (six items, e.g., I am an addict and can never be cured of my disease, but I can learn to live with it; alpha = 0.79), *belief in own powerlessness over addiction* (six items, e.g., my life has become unmanageable because of alcohol and/or drugs; alpha = 0.75), and *commitment to lifelong abstinence* (five items, e.g., I believe I should never use alcohol and any mood altering chemicals again; alpha = 0.83). Patients noted the extent of agreement with each statement on a 4-point scale from 1 = completely disagree, to 4 = completely agree, and items were summed (alpha = 0.80). Previous studies reported the ATAQ subscales to have good concurrent, discriminant, and predictive validity, sensitivity to treatment-related change, and good internal consistency across treatment settings and substance type (Morgenstern et al., 1996, 2002).

We computed correlations among the 6-month 12-step SHG-related variables: number of meetings attended with involvement ($r = 0.50$), number of steps worked ($r = 0.14$), and acceptance of 12-step philosophy ($r = 0.25$); involvement with steps worked ($r = 0.24$) and acceptance ($r = 0.42$); and steps with acceptance ($r = 0.14$).

2.4.3. Abstinence. At the 6-month follow-up, participants were asked how many days out of the past 30 they had used alcohol and drugs (each of 10 different drugs was asked about separately). Participants who had not used any alcohol or drugs during the past 30 days were classified as abstinent; any use was classified as not abstinent.

2.5. Baseline comparisons of patients followed or not followed at 6 months

We compared patients followed ($n = 281$, 81.4%) or not followed ($n = 64$, 18.6%) at 6 months on baseline sociodemographic characteristics, ASI composites, and 12-step group attendance and involvement. On sociodemographics, those followed were somewhat more likely to be Caucasian and married, but otherwise the groups did not differ. There were no differences

between groups on ASI composites (alcohol use, drug use) at baseline, or on 12-step group attendance and involvement at baseline.

3. Results

3.1. Predictors of 12-step group attendance

We conducted correlations between baseline predictors in the sociodemographics, severity, functioning, and previous help domains, and number of 12-step group meetings attended during the 6-month follow-up (Table 1). Less education was associated with more meeting attendance, as was more engagement in religious practices, and being more extroverted and skilled at initiating relationships. More 12-step group attendance prior to treatment intake was associated with more subsequent 12-step group attendance.

3.2. Predictors of 12-step group involvement

Correlations conducted between baseline predictors and overall involvement in 12-step groups (Table 1) showed that younger age and having a less stable residence were associated with more involvement. Having a religious preference and being more engaged in religious practices, and seeing oneself as extroverted and as skilled at initiating relationships, were also associated with more involvement overall. Having attended more 12-step meetings and received more professional treatment prior to baseline were related to more 12-step group involvement during

the 6-month follow-up period. When we conducted partial correlations between baseline predictors and overall involvement, controlling for number of meetings attended during follow-up, findings were comparable.

3.3. Predictors of number of steps worked

We also conducted correlations between baseline predictors and how many steps participants had worked during the follow-up period (Table 1). The only significant predictors of more steps worked were a history of more stable employment, more engagement in religious practices, and more 12-step meeting attendance reported at baseline.

3.4. Predictors of 12-step beliefs

Younger age, membership in a minority racial or ethnic group, less education, and having a less stable residence were related to a stronger endorsement of 12-step principles (Table 1). Addiction severity was not related to acceptance of 12-step philosophy. Having a religious preference and more engagement in religious practices were associated with a stronger acceptance of 12-step principles, as were previous 12-step meeting attendance and professional treatment.

3.5. Predictors of abstinence at the 6-month follow-up

Using χ^2 and *t*-test, we examined associations of baseline predictors, and of 12-step attendance, involvement, Step

Table 1
Correlations of baseline predictors with 12-step affiliation at the 6-month follow-up

| | No. of 12-step meetings (<i>r</i>) | Involvement (<i>r</i>) | No. of steps worked (<i>r</i>) | Acceptance of 12-step beliefs (<i>r</i>) |
|-----------------------------------------|--------------------------------------|--------------------------|----------------------------------|--------------------------------------------|
| Sociodemographics | | | | |
| Age | −0.066 | −0.146* | 0.021 | −0.130* |
| Not Caucasian | 0.065 | 0.088 | −0.085 | 0.203** |
| Married | −0.013 | −0.012 | −0.059 | 0.066 |
| Years education | −0.186** | −0.040 | 0.077 | −0.155** |
| Employed | −0.018 | 0.074 | 0.102 | 0.000 |
| No. of months longest job | −0.104 | −0.077 | 0.161** | −0.034 |
| Monthly income | −0.013 | 0.001 | 0.014 | 0.002 |
| No. of months current residence | −0.117 | −0.242*** | −0.058 | −0.210*** |
| Severity of problems at baseline | | | | |
| ASI composite | | | | |
| Alcohol | 0.120 | 0.089 | 0.058 | 0.061 |
| Drugs | 0.069 | 0.096 | −0.032 | 0.093 |
| Using >1 substance | 0.025 | 0.014 | −0.057 | 0.084 |
| Personal functioning at baseline | | | | |
| Has religious preference | 0.091 | 0.220*** | 0.102 | 0.277*** |
| Religious practices | 0.190*** | 0.210*** | 0.117* | 0.171** |
| Extroversion | 0.141* | 0.119* | 0.081 | −0.005 |
| Relationship initiation | 0.143* | 0.113* | 0.042 | −0.021 |
| Help received at baseline | | | | |
| No. of 12-step meetings attended | 0.120* | 0.210*** | 0.294*** | 0.121* |
| No. of formal treatments | 0.027 | 0.201*** | 0.000 | 0.202*** |

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

Table 2
Comparisons of abstinent and non-abstinent patients at the 6-month follow-up on baseline predictors and 6-month 12-step affiliation

| | Abstinent (n = 168) | Non-abstinent (n = 113) | χ^2/t |
|----------------------------------------------------------------------------------|---------------------|-------------------------|------------|
| Sociodemographics | | | |
| Age in years (mean) | 50.0 | 50.9 | -0.90 |
| Race and ethnicity (%) | | | 5.65 |
| Caucasian | 49.4 | 43.4 | |
| Black | 41.1 | 37.2 | |
| Hispanic | 6.0 | 11.5 | |
| Other | 3.6 | 8.0 | |
| Married (%) | 19.1 | 10.0 | 4.39* |
| Years of education (mean) | 13.3 | 13.2 | 0.57 |
| Employed (%) | 86.3 | 80.0 | 1.85 |
| No. of months of longest job (mean) | 100.9 | 88.3 | 1.18 |
| Monthly income, \$ (mean) | 1150 | 1172 | -0.09 |
| No. of months current residence (mean) | 32.5 | 45.3 | -1.68 |
| Severity of problems at baseline | | | |
| ASI composite (mean) | | | |
| Alcohol use | 0.304 | 0.313 | -0.27 |
| Drug use | 0.100 | 0.150 | -3.30*** |
| Using more than 1 substance (%) | 40.7 | 64.2 | -14.20*** |
| Personal functioning at baseline | | | |
| Has a religious preference (%) | 76.0 | 74.1 | 0.14 |
| Religious practices (mean) | 30.5 | 27.7 | 1.55 |
| Extroversion (mean) | 38.6 | 35.9 | 2.91** |
| Relationship initiation (mean) | 2.4 | 2.3 | 1.65 |
| Help received at baseline | | | |
| No. of 12-step meetings attended (mean) | 546.4 | 446.9 | 1.00 |
| No. of formal treatment episodes (mean) | 8.2 | 9.0 | -0.60 |
| 12-Step attendance, involvement, steps worked, and acceptance at 6 months | | | |
| No. of meetings (mean) | 80.4 | 54.2 | 2.89** |
| Involvement (mean) | 2.7 | 1.6 | 6.45*** |
| No. of Steps worked (mean) | 4.4 | 3.4 | 2.00* |
| Acceptance of 12-step beliefs (mean) | 57.8 | 53.4 | 3.73*** |

* $p < .05$.

** $p < .01$.

*** $p < .001$.

work, and beliefs at 6 months, with abstinence at 6 months (Table 2). Of the baseline sociodemographic characteristics, only being married was associated with abstinence. Patients who had more severe drug problems and used more than one substance at baseline, and were less extroverted, were less likely to be abstinent at 6 months. More attendance at 12-step meetings during the 6-month follow-up period, more involvement in 12-step groups, working more steps, and greater acceptance of 12-step beliefs were related to a higher likelihood of abstinence.

We conducted a logistic regression analysis to predict abstinence at 6 months from the patient characteristics with significant relationships in Table 2. The significant independent predictors of abstinence were being more extroverted ($B = 0.05$, $p < 0.05$) and having more overall involvement in 12-step groups ($B = 0.53$, $p < 0.001$); $\chi^2(8) = 47.15$, $p < 0.001$. Marginally significant predictors of abstinence were having less severe drug problems at intake ($p < 0.07$) and using a single rather than multiple substances ($p < 0.09$).

3.6. Moderating associations of 12-step attendance and involvement with abstinence

We examined the extent to which patients' characteristics at baseline moderated associations of 12-step attendance and involvement with likelihood of abstinence at 6 months. We conducted two sets of logistic regression analyses to predict abstinence. In the first set, we entered the number of 12-step meetings attended between baseline and the 6-month follow-up, one baseline predictor (within the domains of sociodemographics, severity of SUDs, personal functioning, and help received), and the interaction of number of meetings with the baseline predictor. In the second set, we entered involvement, a baseline predictor, and their interaction. For the interactions, constituent variables were centered around zero (Finney et al., 1984).

3.6.1. Sociodemographics. There was a significant interaction of patient age with both number of 12-step meetings ($B = 0.001$, $p < 0.05$) and involvement ($B = 0.035$, $p < 0.01$) on abstinence:

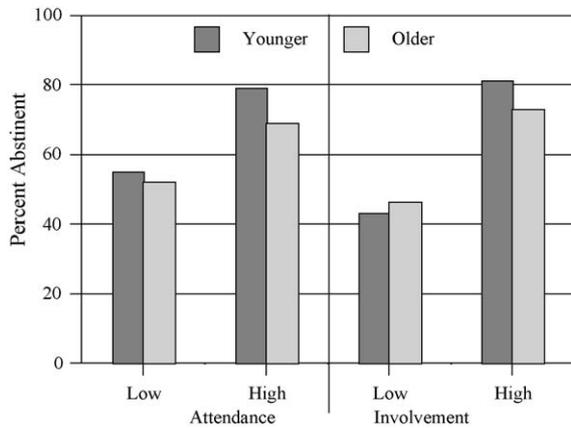


Fig. 1. Age as a moderator of the relationship between 12-step meeting attendance or involvement and abstinence at 6 months.

associations between more meeting attendance and involvement with abstinence were stronger for younger than for older patients (Fig. 1). A significant interaction with race (white or not white) ($B = 0.014, p < 0.05$) showed that the association between more meeting attendance and abstinence was stronger for white patients. Further, there was a significant interaction of education with number of meetings ($B = 0.003, p < 0.05$) such that the association of attendance with abstinence was stronger for less-educated patients. Significant interactions of job instability with both number of meetings ($B = 0.001, p < 0.01$) and involvement ($B = 0.002, p < 0.05$) showed that associations of more meeting attendance and involvement with abstinence were stronger for patients with more job instability.

3.6.2. Personal functioning. A significant interaction of religious preference with number of meetings ($B = 0.017, p < 0.05$) found the association of more meetings with abstinence to be stronger for patients without a religious preference. In addition, there was a significant interaction of relationship initiation ($B = 0.006, p < 0.05$) with number of meetings: the association of more meetings with abstinence was stronger for patients less skilled at initiating relationships. There were no interactions involving severity of disorder or previous help.

4. Discussion

Among this sample of SUD patients beginning a new treatment episode, only 14% did not attend a 12-step group meeting during the 6-month follow-up period. Our results agree with other findings suggesting that 12-step group attendance among individuals under treatment for SUDs appears to have become normative (Humphreys et al., 1998; Kelly and Moos, 2003).

4.1. 12-Step meeting attendance and involvement, and steps worked

Similar patient characteristics were associated with attending more 12-step meetings during follow-up and being more

involved in 12-step groups. Specifically, being more engaged in religious practices (Christo and Franey, 1995; Tonigan et al., 2002) and more extroverted (Galaif and Sussman, 1995; Hurlburt et al., 1984) and skilled at initiating relationships were related to more attendance and involvement. The findings inform how treatment providers should encourage patients who are reluctant to initiate and sustain attendance at, and become involved in, 12-step groups to reconsider these options. One method is to clear up misconceptions patients may have about 12-step groups, such as that “higher power” is necessarily a religious concept. Rather, as providers may explain, it reflects a power greater than oneself, such as treatment staff and/or other patients (Noordsy et al., 1996). Alternatively, patients can be referred to self-help groups with a more cognitive-behavioral focus, such as SMART Recovery (Li et al., 2000). A method for encouraging attendance and involvement among less extroverted individuals is for providers to work with 12-step group volunteers, who meet personally with patients to talk about the benefits of the 12-step program and attend meetings with them (Blondell et al., 2001; Sisson and Mallams, 1981). Or, providers may themselves accompany patients to meetings (Chappel and DuPont, 1999). Importantly, if patients resist 12-step group attendance and involvement despite the provider’s encouragement, counselors should accept this for the time being and look for opportunities at a later time to raise the topic again (Mueser et al., 2003).

We also found that having less education was associated with attending more meetings (Galaif and Sussman, 1995), and that being younger with less residential stability and more formal treatment experiences was associated with more involvement. Our findings on age stand in contrast to others’ results that older individuals were more likely to sustain attendance and be involved in 12-step groups (Boscarino, 1980; Christo and Franey, 1995; Galaif and Sussman, 1995; Pagano et al., 2004). This difference may be due to the fact that our sample was older (mean age = 50, range = 24–75 years old) than the samples in these other studies (e.g., patients in Christo and Franey (1995) were, on average, 30.5 years old, ranging from 20 to 46; patients in Pagano et al. (2004) were, on average, 40.2 years old). Because older (55 years old or older) substance abuse patients tend to have more social resources than younger patients do (Arndt et al., 2005), the older individuals in our study may have had access to some of the social support often gained by involvement in 12-step groups. Similarly, patients with a long-term residence who were less involved in 12-step groups may have already had a social network in place to give them the fellowship and support for abstinence that SHGs often provide. Residential stability is associated with greater access to social resources, including help from, trust in, and attachment to others that can be tapped during times of difficulty and used to garner and sustain a healthful environment (Berkman and Kawachi, 2000; Boardman, 2004; Browning and Cagney, 2002).

In addition, patients who had more 12-step group attendance or involvement during the 6-month follow-up period had more previous 12-step meeting exposure or formal treatment (Brown et al., 2001; Christo and Franey, 1995; Kaskutas et al., 1999). Similarly, among patients beginning detoxification, those with

more 12-step group experience expressed stronger intentions to attend 12-step groups afterwards (Kahler et al., 2004). These results suggest that, even when AA or NA exposure is followed by sustained substance misuse or by relapse, 12-step groups are still often viewed as a potentially helpful option and individuals are ready to attend again.

There were few predictors of the number of steps patients worked, but the predictors were consistent with those of meeting attendance and involvement; that is, more engagement in religious practices and more prior 12-step meeting attendance were related to working more steps. Job stability also was related to working more steps. Better substance misuse treatment outcomes are associated with working more steps (Cloud et al., 2004) and with employment stability (Kidorf et al., 2004), but research has yet to determine the causal links, if any, between job stability and number of steps worked among SUD patients. People with less stable employment may possess poorer verbal and written skills, and thus be less able to thoroughly work all of the 12 steps (Mankowski et al., 2001).

4.2. *Abstinence*

In the logistic regression, being more extroverted and more involved in 12-step groups were associated with abstinence at 6 months, yielding general agreement with other studies in which more personal resources and 12-step meeting attendance were associated with better outcomes (Gossop et al., 2003; Kahler et al., 2004; Laudet et al., 2004; McKay et al., 2001; Moos, 1997; Ritsher et al., 2002), although attendance was not associated with abstinence in this study when other characteristics were considered. Crits-Christoph et al. (2003) suggested that causation between 12-step involvement and substance use outcomes may be reciprocal. For example, increases in involvement may produce an initial reduction in substance use, which in turn produces more changes in involvement.

4.3. *Moderators of 12-step attendance or involvement with abstinence*

The relationship between 12-step attendance and abstinence was stronger for younger, white, less-educated, unstably employed, less religious, and less interpersonally skilled individuals; and, the relationship between 12-step involvement and abstinence was stronger for younger and unstably employed individuals. We conducted additional analyses comparing these groups (i.e., older to younger, white to minority, patients, and so on), and found that, because they did not differ on abstinence at intake, such pre-treatment differences cannot account for the moderation effects. Generally, individuals who benefited more from 12-step affiliation had fewer social resources than their counterparts who derived less benefit. We considered why a broader array of personal factors moderated the attendance–abstinence, than the involvement–abstinence, relationship. When needier individuals are in the early phases of recovery, the establishment of a regular and consistent practice of going to meetings may give them the structure and personal connections that were lacking in their lives while they were using

substances, and so attendance aided abstinence. In contrast, 12-step group involvement, such as doing service for others, may increase feelings of self-value and social usefulness even among individuals who are initially more privileged in terms of resources, which in turn may benefit abstinence (Crape et al., 2002).

As noted, younger SUD patients with less education, job stability, and interpersonal skills may gain the direction and support for abstinence they need from 12-step groups. In addition, individuals without a religious preference may not have access to the support and fellowship that come from regular attendance at church or another religious or spiritual institution, and so may find a new social network in 12-step groups. Curiously, religious preference moderated the attendance–abstinence relationship but engagement in religious practices did not. People who have a religious preference may see their religious group as a source of help, whereas those who do not have a preference may see options for help only outside of religious institutions and so 12-step groups are more useful to them. In contrast, religious practices (e.g., praying, meditating) are often conducted privately, so that the extent of engagement in these practices is not linked to how much 12-step SHGs are useful. With regard to race and ethnicity, Arroyo et al. (2003) found, similarly to this study, that among patients receiving 12-step facilitation treatment, white individuals had better substance use outcomes than did Hispanic individuals.

Our findings are consistent with others' conclusions that 12-step groups are effective partly because they help patients gain a social network. Alternatively, these groups may help patients replace a social network of alcohol and drug users with friends who support abstinence (Humphreys and Noke, 1997; Longabaugh et al., 1998; Owen et al., 2003). Patients with fewer social resources and skills may need 12-step group membership more to stay clean and sober than do those with ongoing social resources and interpersonal successes.

4.4. *Limitations and conclusions*

A limitation of this study is that all of the patients were treated within the VA, and most of the patients were male. In addition, although most of the patients were Black, Hispanic, or of another minority race or ethnicity and unmarried, Caucasian and married patients were somewhat more likely to be successfully followed. Publicly funded by the federal government, the VA operates the largest SUD treatment system in the United States. Studies comparing SUD care within and outside the VA suggest that VA-based findings may generalize somewhat better to non-profit than to for-profit settings, although all three systems share similarities (Calsyn et al., 1990; Rodgers and Barnett, 2000). Generally, health services in the VA are of similar quality and effectiveness to those in the private sector (Rosenheck et al., 2000). However, the VA patient population has poorer health status compared with the general patient population (Agha et al., 2000). The extent to which our findings will be replicated in studies of male and female patients with more health and social resources and in other health care systems remains to be determined. In addition to limitations of the sample, another

consideration is that even though the significant findings are conceptually sound, the number of analyses increased the likelihood of a Type I error having occurred.

If our results are replicated as to who is less likely to affiliate with 12-step groups and improve on substance use outcomes with such affiliation, providers attempting to encourage participation and target those most likely to benefit from it may want to screen for patients who have fewer social resources and skills and focus facilitation efforts accordingly. For example, among patients with less previous 12-step group exposure, providers may intensify their encouragement efforts by providing education about the nature, expectations, strengths, and limitations of such groups in order to dispel myths, remove barriers, and prepare patients about what to realistically expect when attending meetings (Kelly and Moos, 2003; Mueser et al., 2003). In this regard, a 60 min session providing an introduction to the 12-step program and considering the pros and cons of affiliation, was associated with better substance use outcomes among detoxification patients who had little experience with 12-step groups than was brief advice, consisting of a 5 min session recommending 12-step participation (Kahler et al., 2004). More generally, providers who are caring and empathic while discussing issues such as spirituality, social resource needs, and interpersonal skills deficits may help increase the likelihood of patients' compliance with encouragement to attend and become involved in 12-step groups in order to promote recovery (Kelly and Moos, 2003).

Acknowledgements

This project was supported by the Department of Veterans Affairs Office of Research and Development (Health Services Research and Development Service, IIR 20-067 and RCS 00-001). We thank Peter Banys, Kristyn Dixon, Keith Humphreys, Louis Moffett, Rudolf Moos, and Jill Sempel for help with this project.

References

- Agha, Z., Lofgren, R.P., VanRuiswyk, J.V., Layde, P.M., 2000. Are patients at Veterans Affairs medical centers sicker? A comparative analysis of health status and medical resource use. *Arch. Intern. Med.* 160, 3252–3257.
- Anderson, J.G., Gilbert, F.S., 1989. Communication skills training with alcoholics for improving performance of two of the alcoholics anonymous recovery steps. *J. Stud. Alcohol* 50, 361–367.
- Arndt, S., Gunter, T.D., Acion, L., 2005. Older admissions to substance abuse treatment in 2001. *Am. J. Geriatr. Psychiat.* 13, 385–392.
- Arroyo, J.A., Miller, W.R., Tonigan, J.S., 2003. The influence of Hispanic ethnicity on long-term outcome in three alcohol-treatment modalities. *J. Stud. Alcohol* 64, 98–104.
- Arroyo, J.A., Westerberg, V.S., Tonigan, J.S., 1998. Comparison of treatment utilization and outcome for Hispanics and non-Hispanic whites. *J. Stud. Alcohol* 59, 286–291.
- Ball, S.A., Rounsaville, B.J., Tennen, H., Kranzler, H.R., 2001. Reliability of personality disorder symptoms and personality traits in substance-dependent inpatients. *J. Abnorm. Psychol.* 110, 341–352.
- Berkman, L.F., Kawachi, I., 2000. *Social Epidemiology*. Oxford University Press, New York.
- Blondell, R.D., Looney, S.W., Northington, A.P., Lasch, M.E., Rhodes, S.B., McDaniels, R.L., 2001. Can recovering alcoholics help hospitalized patients with alcohol problems? *J. Fam. Pract.* 50, 447.
- Boardman, J.D., 2004. Stress and physical health: the role of neighborhoods as mediating and moderating mechanisms. *Soc. Sci. Med.* 58, 2473–2483.
- Boscarino, J., 1980. Factors related to “stable” and “unstable” affiliation with alcoholics anonymous. *Int. J. Addict.* 15, 839–848.
- Bottlender, M., Soyka, M., 2005. Impact of different personality dimensions (NEO Five-Factor Inventory) on the outcome of alcohol-dependent patients 6 and 12 months after treatment. *Psychiat. Res.* 136, 61–67.
- Brown, B.S., O’Grady, K.E., Farrell, E.V., Flechner, I.S., Nurco, D.N., 2001. Factors associated with frequency of 12-Step attendance by drug abuse clients. *Am. J. Drug Alcohol Abuse* 27, 147–160.
- Browning, C.R., Cagney, K.A., 2002. Neighborhood structural disadvantage, collective efficacy, and self-rated physical health in an urban setting. *J. Health Soc. Behav.* 43, 383–399.
- Buhrmester, D., Furman, W., Wittenberg, M.T., Reis, H.T., 1988. Five domains of interpersonal competence in peer relationships. *J. Pers. Soc. Psychol.* 55, 991–1008.
- Caetano, R., 1993. Priorities for alcohol treatment research among U.S. Hispanics. *J. Psychoactive Drugs* 25, 53–60.
- Caldwell, P.E., Cutter, H.S., 1998. Alcoholics anonymous affiliation during early recovery. *J. Subst. Abuse Treat.* 15, 221–228.
- Calsyn, D.A., Saxon, A.J., Blaes, P., Lee-Meyer, S., 1990. Staffing patterns of American methadone maintenance programs. *J. Subst. Abuse Treat.* 7, 255–259.
- Chappel, J.N., DuPont, R.L., 1999. Twelve-step and mutual-help programs for addictive disorders. *Psychiat. Clin. N. Am.* 22, 425–446.
- Christo, G., Franey, C., 1995. Drug users’ spiritual beliefs, locus of control and the disease concept in relation to narcotics anonymous attendance and 6-month outcomes. *Drug Alcohol Depend.* 38, 51–56.
- Cloud, R.N., Ziegler, C.H., Blondell, R.D., 2004. What is alcoholics anonymous affiliation? *Subst. Use Misuse* 39, 1117–1136.
- Connors, G.J., Tonigan, J.S., Miller, W.R., 1996. Measure of religious background and behavior for use in behavior change research. *Psychol. Addict. Behav.* 10, 90–96.
- Connors, G.J., Tonigan, J.S., Miller, W.R., MATCH Research Group, 2001. A longitudinal model of intake symptomatology. AA participation and outcome: retrospective study of the project MATCH outpatient and aftercare samples. *J. Stud. Alcohol* 62, 817–825.
- Costa, P.T., McCrae, R.R., 1985. *The NEO Personality Inventory Manual*. Psychological Assessment Resources, Odessa, FL.
- Crape, B.L., Latkin, C.A., Laris, A.S., Knowlton, A.R., 2002. The effects of sponsorship in 12-step treatment of injection drug users. *Drug Alcohol Depend.* 65, 291–301.
- Crits-Christoph, P., Gibbons, M.B., Barber, J.P., Gallop, R., Beck, A.T., Mercer, D., Tu, X., Thase, M.E., Weiss, R.D., Frank, A., 2003. Mediators of outcome of psychosocial treatments for cocaine dependence. *J. Consult. Clin. Psychol.* 71, 918–925.
- Emrick, C.D., Tonigan, J.S., Montgomery, H., Little, L., 1993. Alcoholics anonymous: what is currently known? In: McCrady, B.S., Miller, W.R. (Eds.), *Research on Alcoholics Anonymous: Opportunities and Alternatives*.
- Finney, J.W., Mitchell, R.E., Cronkite, R.C., Moos, R.H., 1984. *J. Health Soc. Behav.* 25, 85–98.
- Fiorentine, R., 1999. After drug treatment: are 12-step programs effective in maintaining abstinence? *Am. J. Drug Alcohol. Abuse* 25, 93–116.
- Galaif, E.R., Sussman, S., 1995. For whom does alcoholics anonymous work? *Int. J. Addict.* 30, 161–184.
- Gilbert, F.S., 1991. Development of a “Steps Questionnaire”. *J. Stud. Alcohol* 52, 353–360.
- Gossop, M., Harris, J., Best, D., Man, L.H., Manning, V., Marshall, J., Strang, J., 2003. Is attendance at alcoholics anonymous meetings after inpatient treatment related to improved outcomes? A 6-month follow-up study. *Alcohol Alcoholism* 38, 421–426.
- Harris, J., Best, D., Gossop, M., Marshall, J., Man, L.H., Manning, V., Strang, J., 2003. Prior alcoholics anonymous (AA) affiliation and the acceptability of the twelve steps to patients entering UK statutory addiction treatment. *J. Stud. Alcohol* 64, 257–261.

- Humphreys, K., Kaskutas, L.A., Weisner, C., 1998. The relationship of pretreatment alcoholics anonymous affiliation with problem severity, social resources, and treatment history. *Drug Alcohol Depend.* 49, 123–131.
- Humphreys, K., Moos, R.H., 1996. Reduced substance-abuse-related health care costs among voluntary participants in alcoholics anonymous. *Psychiat. Serv.* 47, 709–713.
- Humphreys, K., Noke, J.M., 1997. The influence of post-treatment mutual help group participation on the friendship networks of substance abuse patients. *Am. J. Community Psychol.* 25, 1–16.
- Hurlburt, G., Gade, E., Fuqua, D., 1984. Personality differences between alcoholics anonymous members and nonmembers. *J. Stud. Alcohol* 45, 170–171.
- Kahler, C.W., Read, J.P., Ramsey, S.E., Stuart, G.L., McCrady, B.S., Brown, R.A., 2004. Motivational enhancement for 12-step involvement among patients undergoing alcohol detoxification. *J. Consult. Clin. Psychol.* 72, 736–741.
- Kaskutas, L.A., Weisner, C., Lee, M., Humphreys, K., 1999. Alcoholics anonymous affiliation at treatment intake among white and black Americans. *J. Stud. Alcohol* 60, 810–816.
- Kelly, J.F., Moos, R., 2003. Dropout from 12-step self-help groups: prevalence, predictors, and counteracting treatment influences. *J. Subst. Abuse Treat.* 24, 241–250.
- Kidorf, M., Neufeld, K., Brooner, R.K., 2004. Combining stepped-care approaches with behavioral reinforcement to motivate employment in opioid-dependent outpatients. *Subst. Use Misuse* 39, 2215–2238.
- Kikuchi, Y., Inoue, T., Ito, M., Masuda, M., Yoshimura, K., Watanabe, S., 1999. Health consciousness of young people in relation to their personality. *J. Epidemiol.* 9, 121–131.
- Kingree, J.B., 1997. Measuring affiliation with 12-step groups. *Subst. Use Misuse* 32, 181–194.
- Laudet, A.B., Magura, S., Cleland, C.M., Vogel, H.S., Knight, E.L., Rosenblum, A., 2004. The effect of 12-step based fellowship participation on abstinence among dually diagnosed persons: a 2-year longitudinal study. *J. Psychoactive Drugs* 36, 207–216.
- Li, E.C., Feifer, C., Strohm, M., 2000. A pilot study: locus of control and spiritual beliefs in alcoholics anonymous and SMART recovery members. *Addict. Behav.* 25, 633–640.
- Longabaugh, R., Wirtz, P.W., Zweben, A., Stout, R.L., 1998. Network support for drinking. Alcoholics anonymous and long-term matching effects. *Addiction* 93, 1313–1333.
- Mankowski, E.S., Humphreys, K., Moos, R.H., 2001. Individual and contextual predictors of involvement in twelve-step self-help groups after substance abuse treatment. *Am. J. Community Psychol.* 29, 537–563.
- Martin, E.D., Sher, K.J., 1994. Family history of alcoholism, alcohol use disorders and the five-factor model of personality. *J. Stud. Alcohol* 55, 81–90.
- Maude-Griffin, P.M., Hohenstein, J.M., Humfleet, G.L., Reilly, P.M., Tusel, D.J., Hall, S.M., 1998. Superior efficacy of cognitive-behavioral therapy for urban crack cocaine abusers: main and matching effects. *J. Consult. Clin. Psychol.* 66, 832–837.
- McKay, J.R., Alterman, A.I., McLellan, A.T., Snider, E.C., 1994. Treatment goals, continuity of care, and outcome in a day hospital substance abuse rehabilitation program. *Am. J. Psychiat.* 151, 254–259.
- McKay, J.R., Merikle, E., Mulvaney, F.D., Weiss, R.V., Kopenhaver, J.M., 2001. Factors accounting for cocaine use 2 years following initiation of continuing care. *Addiction* 96, 213–225.
- McLellan, A.T., Kushner, H., Metzger, D., Peters, R., Smith, I., Grissom, G., Pettinati, H., Argeriou, M., 1985a. The fifth edition of the Addiction Severity Index. *J. Subst. Abuse Treat.* 9, 461–480.
- McLellan, A.T., Luborsky, L., Cacciola, J., Griffith, J., Evans, F., Barr, H.L., O'Brien, C.P., 1985b. New data from the Addiction Severity Index: reliability and validity in three centers. *J. Nerv. Ment. Dis.* 173, 412–423.
- McLellan, A.T., Luborsky, L., Woody, G.E., O'Brien, C.P., 1980. An improved diagnostic evaluation instrument for substance abuse patients. The Addiction Severity Index. *J. Nerv. Ment. Dis.* 168, 26–33.
- Montgomery, H.A., Miller, W.R., Tonigan, J.S., 1995. Does alcoholics anonymous involvement predict treatment outcome? *J. Subst. Abuse Treat.* 12, 241–246.
- Moos, R.H., 1997. *Evaluating Treatment Environments: The Quality of Psychiatric and Substance Abuse Programs.* Transaction Publishers, New Brunswick.
- Morgenstern, J., Bates, M.E., 1999. Effects of executive function impairment on change processes and substance use outcomes in 12-step treatment. *J. Stud. Alcohol* 60, 846–855.
- Morgenstern, J., Bux, D., Labouvie, E., Blanchard, K.A., Morgan, T.I., 2002. Examining mechanisms of action in 12-step treatment: the role of 12-step cognitions. *J. Stud. Alcohol* 63, 665–672.
- Morgenstern, J., Bux, D., Labouvie, E., Morgan, T., Blanchard, K.A., Muench, F., 2003. Examining mechanisms of action in 12-step community outpatient treatment. *Drug Alcohol Depend.* 72, 237–247.
- Morgenstern, J., Kahler, C.W., Epstein, E., 1998. Do treatment process factors mediate the relationship between type A-type B and outcome in 12-step-oriented substance abuse treatment? *Addiction* 93, 1765–1775.
- Morgenstern, J., Kahler, C.W., Frey, R.M., Labouvie, E., 1996. Modeling therapeutic response to 12-step treatment: optimal responders, nonresponders, and partial responders. *J. Subst. Abuse* 8, 45–59.
- Morgenstern, J., Labouvie, E., McCrady, B.S., Kahler, C.W., Frey, R.M., 1997. Affiliation with alcoholics anonymous after treatment: a study of its therapeutic effects and mechanisms of action. *J. Consult. Clin. Psychol.* 65, 768–777.
- Mueser, K.T., Noordsy, D.L., Drake, R.E., Fox, L., 2003. *Integrated Treatment for Dual Disorders.* Guilford Press, New York.
- Noordsy, D.L., Schwab, B., Fox, L., Drake, R.E., 1996. The role of self-help programs in the rehabilitation of persons with severe mental illness and substance use disorders. *Community Ment. Health J.* 32, 71–81.
- Ouimette, P.C., Gima, K., Moos, R.H., Finney, J.W., 1999. A comparative evaluation of substance abuse treatment IV. The effect of comorbid psychiatric diagnoses on amount of treatment, continuing care, and 1-year outcomes. *Alcohol. Clin. Exp. Res.* 23, 552–557.
- Owen, P.L., Slaymaker, V., Tonigan, J.S., McCrady, B.S., Epstein, E.E., Kaskutas, L.A., Humphreys, K., Miller, W.R., 2003. Participation in alcoholics anonymous: intended and unintended change mechanisms. *Alcohol. Clin. Exp. Res.* 27, 524–532.
- Pagano, M.E., Friend, K.B., Tonigan, J.S., Stout, R.L., 2004. Helping other alcoholics in alcoholics anonymous and drinking outcomes: findings from project MATCH. *J. Stud. Alcohol* 65, 766–773.
- Reno, R.M., 2004. Personality characterizations of outpatients with schizophrenia, schizophrenia with substance abuse, and primary substance abuse. *J. Nerv. Ment. Dis.* 192, 672–681.
- Ritsher, J.B., Moos, R.H., Finney, J.W., 2002. Relationship of treatment orientation and continuing care to remission among substance abuse patients. *Psychiat. Serv.* 53, 595–601.
- Rodgers, J.H., Barnett, P.G., 2000. Two separate tracks? A national multivariate analysis of differences between public and private substance abuse treatment programs. *Am. J. Drug Alcohol Abuse* 26, 429–442.
- Rosenheck, R.A., Desai, R., Steinwachs, D., Lehman, A., 2000. Benchmarking treatment of schizophrenia: a comparison of service delivery by the national government and by state and local providers. *J. Nerv. Ment. Dis.* 188, 209–216.
- Sample, S.J., Patterson, T.L., Shaw, W.S., Grant, I., Moscona, S., Jeste, D.V., 1999. Self-perceived interpersonal competence in older schizophrenia patients: the role of patient characteristics and psychosocial factors. *Acta Psychiat. Scand.* 100, 126–135.
- Sisson, R.W., Mallams, J.H., 1981. The use of systematic encouragement and community access procedures to increase attendance at alcoholic anonymous and AI-Anon meetings. *Am. J. Drug Alcohol Abuse* 8, 371–376.
- Snow, M.G., Prochaska, J.O., Rossi, J.S., 1994. Processes of change in alcoholics anonymous: maintenance factors in long-term sobriety. *J. Stud. Alcohol* 55, 362–371.
- Tonigan, J.S., Connors, G.J., Miller, W.R., 1998. Special populations in alcoholics anonymous. *Alcohol Health Res. World* 22, 281–285.

- Tonigan, J.S., Miller, W.R., Schermer, C., 2002. Atheists, agnostics, and alcoholics anonymous. *J. Stud. Alcohol* 63, 534–541.
- Tonigan, J.S., Toscova, R., Miller, W.R., 1996. Meta-analysis of the literature on alcoholics anonymous: sample and study characteristics moderate findings. *J. Stud. Alcohol* 57, 65–72.
- Wieczorek, W.F., Miller, B.A., 1992. Preliminary typology designed for treatment matching of driving-while-intoxicated offenders. *J. Consult. Clin. Psychol.* 60, 757–765.
- Winzelberg, A., Humphreys, K., 1999. Should patients' religiosity influence clinicians' referral to 12-step self-help groups? Evidence from a study of 3018 male substance abuse patients. *J. Consult. Clin. Psychol.* 67, 790–794.
- Yoshimura, K., 2000. The psychological characteristics of tobacco dependence in a rural area of Japan. *J. Epidemiol.* 10, 271–279.
- Zemore, S.E., Kaskutas, L.A., 2004. Helping, spirituality and alcoholics anonymous in recovery. *J. Stud. Alcohol* 65, 383–391.