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Predictors of motivation for abstinence at the end of outpatient substance abuse treatment

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Abstract

Commitment to abstinence, a motivational construct, is a strong predictor of reductions in drug and alcohol use. Level of commitment to abstinence at treatment end predicts sustained abstinence, a requirement for recovery. This study sought to identify predictors of commitment to abstinence at treatment end to guide clinical practice and to inform the conceptualization of motivational constructs. Polysubstance users (N = 250) recruited at the start of outpatient treatment were re-interviewed at the end of services. Based on the extant literature, potential predictors were during treatment measures of substance use and related cognitions, psychological functioning, recovery supports, stress, quality of life satisfaction, and treatment experiences. In multivariate analyses, perceived harm of future drug use, abstinence self-efficacy, quality of life satisfaction, and number of network members in 12-step recovery contributed 26.6% of the variance explained in the dependent variable, a total of 49.6% when combined with the control variables (demographics and baseline level of the outcome). Gender subgroup analyses yielded largely similar results. Clinical implications of findings for maximizing commitment to abstinence when clients leave treatment are discussed as are future research directions.

Keywords

Motivation; abstinence; substance abuse services; treatment; addiction; recovery

1. Introduction

1.1 Motivational conceptualizations in the addiction field

Motivational constructs are key targeted elements of most theoretical approaches to substance abuse treatment and are strong predictors of change in alcohol (Morgenstern, Labouvie, McCrady, Kahler, & Frey, 1997) and drug use. Motivation level influences treatment engagement, retention and outcomes (Simpson, 2001), and higher motivation for change prospectively predicts greater reductions in substance use (Burman, 1997; Hall, Havassy, & Wasserman, 1991; Hser, 2007). Several theoretical conceptualizations of motivation have guided a large body of research. Perhaps most notably, the ‘stage of change’ theory and ‘readiness to change’ construct (RTC) originally developed in the

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context of smoking cessation (Prochaska & DiClemente, 1983), have been applied to substance use disorders (DiClemente, 2003; Prochaska, DiClemente, & Norcross, 1992). The stages of change theory provided the theoretical basis for Motivational Interviewing (Miller & Rollnick, 1991; Miller & Rollnick, 2002) and its manualized brief version, Motivation Enhancement Therapy (Miller, Zweben, DiClemente, & Rychtarik, 1992), both widely used and generally effective at fostering reductions in substance use (Babor & Del Boca, 2003; UKATT Research Team, 2005). A focused subset of models conceptually related to RTC have examined *motivation for treatment* more specifically and its relationship to treatment retention, engagement, and outcomes (Battjes, Onken, & Delany, 1999). These models include the TCU Treatment Motivation model that centers on stages of treatment readiness (Simpson & Joe, 1993) and the Circumstances, Motivation, Readiness, and Suitability model (CMRS; De Leon & Jainchill, 1986; De Leon, Melnick, & Kressel, 1997). The latter does not postulate discrete cognitive stages, but rather, examines external and internal influences on an individual's readiness for treatment.

In addition to the broad motivational construct of *readiness* to change and to seek help, a second, domain-specific motivation construct is *commitment to a goal of total and permanent abstinence* from drugs and alcohol. This construct is especially relevant to severely dependent persons as there is a broad consensus that abstinence is a requirement for recovery. The Center for Substance Abuse Treatment (CSAT, 2006) defines recovery as “a process of change through which an individual achieves abstinence and improved health, wellness, and quality of life” (p.9), and other recent definitions concur, with one expert panel noting that: “Sobriety (...) is considered to be primary and necessary for a recovery lifestyle”, p.222). These definitions of recovery are consistent with research showing that severely dependent substance users who seek recovery choose total abstinence as their goal, (Laudet, 2007), even in countries where treatment services do not focus on an abstinence goal – e.g., Australia (Laudet & Storey, 2006). There is also evidence that most failed remission attempts are based on moderation and that abstinence proves more successful (Burman, 1997; Maisto, Clifford, Longabaugh, & Beattie, 2002) and more stable over time than does non-problematic use (Ilgen, Wilbourne, Moos, & Moos, 2008). Among clients of outpatient services, using the same sample as that of the present study, we have reported that higher commitment to abstinence *at intake* enhances the odds of treatment completion, that in turn significantly increases the odds of sustaining abstinence for a full year after treatment ends (Stanick, Laudet, & Sands, 2007); moreover, after controlling for substance use status at the end of treatment, level of commitment to abstinence *at the end of treatment* predicts significantly greater odds of continuously sustained abstinence for the entire first post-treatment year (OR = 2.27; 95% CI = 0.79-6.54) with findings especially significant among males (OR = 5.16; 95% CI = 1.36–17.36).

Given the critical role of motivational constructs and of abstinence to subsequent substance use outcomes, it is of theoretical and clinical importance to identify factors that promote or hinder commitment to abstinence, especially factors that are amenable to change. Motivational constructs are most often examined as predictor variables in studies seeking to quantify their contribution to substance use and/or treatment outcomes – e.g., engagement or retention (see earlier discussion). Fewer studies have sought to identify domains that influence motivation. DiClemente and colleagues recently published findings from a study exploring the contributions of theoretically relevant predictors of motivation (DiClemente, Doyle, & Donovan, 2009). They used baseline data from the COMBINE Study, a multisite clinical trial evaluating the relative efficacy of naltrexone and acamprosate administered individually and in combination along with 2 intensities of behavior therapies. Noting the “growing consensus that motivation involves multiple constructs” (p. 879), the authors examined the role of theoretically relevant domains as predictors of readiness to change scores in a cross-sectional design; the domains included drinking severity and consequences,

expectancies (efficacy and treatment), and complicating/supportive personal (stress and psychiatric symptoms) and environmental (number of drinkers in environment and quality of environment) factors. Results showed that in addition to two demographic variables (female and older age), positive predictors of RTC were a greater percentage of days abstinent, lower perceived stress, and higher levels of alcohol problems, of alcohol dependence, psychiatric symptoms, quality of life, abstinence self-efficacy, and positive expectations about treatment. These findings suggest that an individual's level of motivation to change is the product of internal and external circumstances, several of which may be amenable to intervention.

1.2 Study objectives

While many studies have examined motivation at treatment entry, identifying predictors of motivation at the end of treatment is of great clinical relevance as well: End of treatment measures provide a profile of clients as they initiate the post-treatment period, a time that is highly vulnerable to relapse (Finney, Hahn, & Moos, 1996; Grella, Hser, & Hsieh, 2003; Laudet, Stanick, & Sands, 2007) but can also cement and build on treatment gains toward a the broader goal of recovery (e.g., obtaining training and/or employment, rebuilding social and family relationships). As mentioned earlier, in this sample, end of treatment commitment to abstinence significantly enhanced the odds of sustained abstinence over the subsequent year (Stanick, Laudet, & Sands, 2007). Moreover, identifying predictors of motivation at the end of treatment can point to domains that represent intervention loci for clinicians, toward maximizing motivation and ultimately the likelihood of positive post-treatment outcomes. Building on Diclemente's study, we seek to identify predictors of commitment to abstinence at the end of outpatient treatment. Gender differences have been reported in motivation levels and more specifically, in the role of commitment to abstinence on treatment completion and subsequent substance use. As predictors may also differ between men and women, gender differences will be examined.

2. Materials and Methods

2.1 Setting and recruitment

Recruiting took place at two publicly-funded state licensed intensive outpatient treatment programs in New York City. As described elsewhere both programs, located in underserved communities in New York City, met the definition of an "eclectic" orientation, incorporating both 12-step and cognitive-behavioral principles (Humphreys, Huebsch, Finney, & Moos, 1999), and are relatively intensive and highly structured. Clients are required to attend 5 days a week from 9:00 a.m. to 3:00 p.m. for groups and individual counseling sessions as well as for relapse prevention classes, special topic groups (e.g., men/women groups, AIDS education, domestic violence prevention), and vocational training. The study was introduced to clients during their orientation session (immediately after official admission). Clients who expressed interest in participating met with the interviewer who explained the voluntary nature of the study and what participation in the study entailed; the signed informed consent procedure was administered and the baseline interview was conducted, lasting two and a half hours on average. Clients were re-interviewed when they left services, regardless of the reason for ending treatment (treatment completion, transfer or dropping out). A \$30 cash incentive was offered for each of the interviews. Two hundred and seventy-eight consecutive admissions were recruited between September 2003 and December 2004 (96% of those asked); 250 were re-interviewed at the end of treatment (EOT; 89.9% retention) and constitute the sample for this study. The study was reviewed and approved by the NDRI Institutional review Board (IRB) and by the ethics review boards of the two participating service agencies; we also obtained a certificate of confidentiality from our funding agency.

2.2 Data collection procedures and measures

Study data were collected through semi-structured instruments administered via computer assisted-interviewing using the QDS software (Nova Research, Inc.). The instruments consisted of standardized scales described below.

2.3 Measures

We assessed the same domains as potential predictors of commitment to abstinence as did the DiClemente study summarized earlier. Demographic information was collected at baseline using the Addiction Severity Index (ASI; that also provided data on substance use problems and psychiatric functioning at the end of treatment (EOT; see below). The other measures follow. With the exception of treatment history and treatment mandated status, the data used for this study come from measures collected at the end of treatment interview.

2.3.1 Substance abuse treatment

Mandated to treatment: At baseline, participants were asked: ‘Was your coming to drug treatment at this time required or recommended by the criminal justice system (judge, probation/parole, etc.)?’

Treatment history: The number of prior treatment episodes was computed from baseline information about whether participants had ever received addiction treatment services and if so, the number of episodes received in various modalities (e.g., methadone maintenance, inpatient rehab, and outpatient treatment).

Duration of index episode: The number of days in treatment was computed from program records (with participant consent) on the date of admission and last date of services.

Helpfulness of services: The overall helpfulness of services was rated at the discharge interview using a scale ranging from 0 = Not at all helpful; to 10 = extremely helpful.

2.3.2 Substance use related domains

Dependence severity: We used the Non-alcohol Psychoactive Substance Use Disorders subscale of the Mini International Neuropsychiatric Interview (M.I.N.I.), a short structured interview developed to diagnose DSM-IV and ICD-10 psychiatric disorders. The 14-items, answered in a yes/no format, yield a single score that can range from 0 to 14.

Drug problems: We used an item from the ASI, representing the number of days participants had experienced drug problems in the past month.

Cravings and temptation to use drugs: Frequency of cravings and urges to use drugs or to drink in the past month was rated on a scale ranging from 0 (never) to 7 (once a day or more).

Drug abstinence self-efficacy: Self-rated level of confidence in one's ability to resist using drugs in diverse ‘trigger’ situations (e.g., having cravings, being bored) was assessed using the Alcohol Abstinence Self-efficacy Scale (DiClemente, Carbonari, Montgomery, & Hughes, 1994) adapted in wording for polysubstance users. The summary score can range from 1 (Not at all confident) to 5 (Extremely confident).

Perceived harm of drug use: The future harm subscale of *The Primary Appraisal Measure* (PAM; Morgenstern et al., 1997) assesses overall perception of harms anticipated from future substance use. The score can range from 1 (No harm) to 5 (Extreme harm).

Commitment to abstinence: The Commitment to Abstinence subscale of the Addiction Treatment Questionnaire – ATAQ- (Morgenstern, Kahler, Frey, & Labouvie, 1996) consists of seven items, each rated for level of agreement on a Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). Sample items: “I should never use drugs again,” and “Once I am not under so much stress, I will be able to use drugs and drink in moderation” (reversed coding). This score was the outcome domain for the study.

2.3.3 Psychological functioning—*Psychological functioning* in the past month was assessed using the relevant ASI composite score.

Stress “Overall, how stressed have you been since the entering treatment?” Answer scale: 0 = not at all to 10 = extremely.

Quality of life satisfaction “Overall, how satisfied are you with your life right now?” answered on a visual scale where 1 = not at all, and 10 = completely. This item from the World Health Organization Quality of Life Instrument (WHOQOL Group, 1998) assesses participants' overall evaluation of their life satisfaction, taking into account the balance between positive and negative as it was relevant to *their* individual experience rather than the researcher determining which life domains are or are not relevant to participants' quality of life satisfaction.

2.3.4 Recovery support resources

Recovery support: The Social Support for Recovery Scale (SSRS) consists of 11 items rated on a Likert-type scale (1= strongly disagree to 4 = strongly agree). Sample item: “The people in my life understand that I am working on myself” (Vogel, Knight, Laudet, & Magura, 1998).

Network members in 12-step recovery: “Thinking about the people with whom you have regular contact, how many are actively involved in a 12-step fellowship like Narcotics or Alcoholics Anonymous (attending meetings, working the steps)?”

Participation in 12-step recovery fellowships: Twelve-step affiliation consists of two dimensions: meeting attendance and involvement in 12-step suggested activities (see below). (a) *Meeting attendance* data for this study represents the number of Alcoholics Anonymous (AA), Narcotics Anonymous (NA) and/or Cocaine Anonymous (CA) meetings attended since entering treatment (whether at the program or in the community); (b) *12-step Involvement* is the sum of nine 12-step activities participants may have engaged in since entering treatment (e.g., having a sponsor; working the steps; doing service; reading recovery literature).

2.5 Statistical Analyses

The analyses proceeded in three stages. First, means and frequency distributions were used to describe the sample; gender differences in key study domains were examined using chi square for categorical variables and ANOVAS for continuous measures. Next, zero-order bivariate correlations between the predictors and outcome domains were examined. Finally, domains that yielded a significant bivariate association (<.05) with EOT commitment to abstinence, the outcome variable -either for the total sample or for one of the gender subgroups - were entered into the multiple linear regression where baseline level of the outcome variable was entered in the first block and the demographics (age, male gender, African American race and Hispanic ethnicity) in the second block. Following DiClemente's, because some of the 16 predictor variables were likely intercorrelated, we used the forward stepwise method to determine inclusion or exclusion from the model

sequentially, based on the statistical significance of the coefficient for each variable. Separate regression analyses were conducted for the total sample and by gender subgroup. The significance level for all statistical tests was set at $p < .05$.

3. Results

3.1 Descriptives of sample and predictor domains

Participants were 56.2% males with an average age of 39.2 years (range 19 to 60, Std. Dev = 9.0); most were from ethnic minority groups (61.2% African-American, 21.6% Caucasian and 17.2% of mixed ethnicities); 35.5% reported being Hispanic. Mean educational attainment was 10.5 years; 73.7% relied on government assistance as their primary income source. Almost all (92.4%) cited multiple problem substances with a mean of 3.6 substances including crack (44.4%), alcohol (18.4%), heroin (14.4%), marijuana (14%), cocaine other than crack (7.6%), and 1.2 % 'other.' Most (79.2%) had received substance abuse services prior to the index episode; the number of previous episodes was 4.8 with men reporting a significantly greater number of prior episodes. One quarter of the sample had been mandated/encouraged by the criminal justice system to enroll in the index episode with one third of men being mandated compared to 15% women (Table 1).

Commitment to abstinence level at EOT corresponded roughly to the 'agree' answer scale point, with women scoring marginally higher. In terms of predictor domains, participants attended treatment for an average of 5 months with women staying enrolled significantly longer than men; the overall helpfulness of services was relatively high and significantly higher among women. At the end of treatment, dependence severity, cravings/temptations to use and extent of drug problem were relatively low; perceived harms of future substance use was close to the maximum scale range, especially among women. Drug abstinence self-efficacy was moderate overall and among men, and significantly higher among women. Stress levels were moderate overall and in both gender groups, and psychological problems were relatively low; overall quality of life satisfaction was relatively high, and significantly higher among women. Perceived support for recovery was moderate and the number of network members in 12-step recovery was low. Participants attended an average of 33 12-step meetings while in treatment, corresponding to more than one meeting per week based on the average duration of stay in treatment, though the variance in number of meetings was very high; women attended nearly 50% more meetings than men though this did not reach statistical significance. Involvement in 12-step activities was low overall and in both gender subgroups.

3.2 Bivariate association of control and predictor variables with commitment to abstinence at treatment end

Four of the five background variables yielded significant results (Table 2): Male gender and Hispanic background were negative correlates of EOT commitment to abstinence whereas being African American and older were associated with higher levels of EOT commitment to abstinence as was baseline level of commitment to abstinence; education level did not yield a significant association.

Of the sixteen predictor domains, thirteen yielded significant results: positive correlations with EOT commitment to abstinence were observed with longer treatment duration, higher treatment helpfulness, greater perceived harm from future drug use, higher drug abstinence self-efficacy, higher quality of life satisfaction, greater support for recovery, a greater number of 12-step members in one's social network, and greater 12-step participation during treatment - i.e., having attended more 12-step meetings and engaged in a greater number of 12-step related activities. In addition, negative correlates of EOT commitment for abstinence

were greater dependence severity during treatment, a greater number of days with drug problems and with cravings or temptation to use drug in the past month, as well as higher stress levels. Number of previous treatment episodes, being mandated to the index episode, and psychological functioning were not significantly associated with the outcome domain.

The above findings were essentially replicated in gender subgroup analyses, with the following exceptions: treatment duration was not significantly associated with EOT commitment to abstinence for either of the gender subgroups; dependence severity, number of days of drug problems and level of cravings and temptation to use significantly predicted the dependent variable among women only while number of 12 step meetings attended during treatment predicted commitment to abstinence among men only.

3.3 Predictors of end of treatment commitment to abstinence in multivariate analyses

Table 3 shows results for the domains that yielded significant associations. For the total sample, in terms of control variables, baseline level of commitment to abstinence accounted for 23% of the variance explained (adjusted R^2 , $F = 71.56$, $p = .00$) and of the demographic variables, only male gender approached statistical significance ($p < .1$), accounting for 2.2% of the explained variance. Four predictor domains emerged as significant, contributing 26.6% of the explained variance: greater perceived harm from future use, higher drug abstinence self-efficacy, higher quality of life satisfaction and greater number of 12-step members in one's network; combined with the control variables, these domains accounted for a total of 49.6% of the variance explained in the dependent variable.

Findings were generally similar in gender subgroup analyses, with three notable differences: quality of life satisfaction did not reach significance in either gender subgroup, stress level was negatively associated with commitment to abstinence among women only, and number of 12 step members in one's social network was significant among men only. Combined with the control variables, these predictors accounted for 48.1% of the variance explained in end of treatment commitment to abstinence among men, and 42.4% among women.

4. Discussion

4.1 Reprise of key findings

We sought to identify predictors of commitment for abstinence at the end of outpatient treatment, a prognostic indicator of post-treatment outcomes, among inner-city polysubstance users. Considered as potential predictors were end of treatment levels of intra- and interpersonal domains previously found to predict a related motivational construct, readiness to change (see earlier); most of these domains represent potential sites of clinical intervention. Four domains contributed a quarter of the variance explained in the outcome, a total of 49.6% when combined with the control variables: Perceived harm of future drug use, abstinence self efficacy, quality of life satisfaction, and number of network members in 12-step recovery.

Perceived harm of future use to oneself and to loved ones (e.g., threats to health, job, friendships) is among the strongest predictors of abstinence (Havassy, Wasserman, & Hall, 1993; Hser, 2007; Vaillant, 2003) and one of the key reasons for seeking recovery (Laudet & Sgro, 2007; Laudet, Savage, & Mahmood, 2002). This was perhaps expressed best by a study participant who, after a long 'addiction career,' had attained abstinence; asked what helped him resist temptations to use drugs, he answered: "What worked for me is just the thought that I don't wanna go through that madness no more.... 'Cause if I was to do that, I probably would lose everything" (Laudet, Becker, & White, 2009, p. 233). Strategies such as Motivational Interviewing (Miller & Rollnick, 1991; Miller & Rollnick, 2002) that effectively promote behavior change can also be used to solidify a goal of abstinence (vs.

moderate or occasional use). In both group and individual format, clients can be guided to reflect on and learn from personal experiences with experimental returns to substance use. Exploring relapse experiences among formerly dependent persons, we reported that some participants 'forgot they were addicted' and returned to substance use, only to come to the conclusion that "I cannot use socially" (Laudet & White, 2004b).

Self-efficacy (Bandura, 1977), the level of confidence in one's ability to perform a specific behavior (Bandura, 1995; DiClemente, Fairhurst, & Piotrowski, 1995) has been implicated in addiction remission processes: in particular, high abstinence self-efficacy predicts subsequent reductions in substance use. Our findings indicate that higher levels of abstinence self-efficacy contribute to higher levels of commitment to abstinence. This is logical: it is easier (and presumably more likely) to commit to a goal if one has the skills/resources necessary to attain it. Adaptive skills to cope with temptations to use are typically imparted in relapse prevention groups during treatment, as well as shared among peers in mutual aid groups such as 12-step meetings (e.g., Narcotics Anonymous). Clinicians can build on clients' successes in resisting temptations to use drugs and on successes in other challenging situations (e.g., speaking up for oneself, overcoming obstacles to achieve a goal) to build self-confidence, helping clients to develop and believe in their ability to make healthy decisions.

Quality of life (QOL) is increasingly emphasized in healthcare research and practice as a desirable and measurable outcome of health policy, health-seeking behavior and overall life satisfaction (Finn & Sarangi, 2008). Though largely missing from the addictions (Donovan, Mattson, Cisler, Longabaugh, & Zweben, 2005; Finney, Moyer, & Swearingen, 2003; Smith & Larson, 2003), QOL assessments may represent both an evaluation and a diagnostic tool (Rudolf & Watts, 2002). The domains that are at the core of the QOL construct – psychological and physical health, social functioning (Aaronson, 1991; The WHOQOL Group, 1996) are all affected by active substance use; they are central to emerging definitions of recovery and correspond to White's 'recovery zones' - e.g., physical, psychological, relational, lifestyle (White, 1996). Quality of life among active substance users is generally very poor, and improvements in key QOL domains can be viewed as the fruits of recovery. These improvements may 'increase the price' of future drug use (Bickel, DeGrandpre, & Higgins, 1993) and enhance commitment to abstinence. Consistent with this argument, we reported that controlling for other relevant variables, baseline QOL satisfaction among a prospective cohort of formerly polydrug dependent individuals predicted abstinence sustained for one and two years hence, and that the association was partially mediated by commitment to abstinence. Present findings whereby QOL satisfaction contributes to commitment to abstinence at the end of treatment further underlines the importance of the QOL construct in the addiction field. For clinical practice and service development, this emphasizes the importance of addressing clients' needs in areas other than substance use – e.g., education, employment, housing (Laudet, Stanick, & Sands, 2009). For researchers, this finding suggests the need to elucidate what constitutes the key ingredients of QOL among substance users and to make QOL domains bona fide outcome domains in evaluation research.

The fourth predictor of end of treatment commitment to abstinence was the number of 12-step members in one's social network. The importance of substance use-related characteristics of one's social network members has been previously demonstrated (Longabaugh, Wirtz, Zweben, & Stout, 1998; Project MATCH Research Group, 1997); in particular, friends' support for abstinence predicts subsequent abstinence (Humphreys, Moos, & Cohen, 1997) and is one of the mechanisms underlying the beneficial effects of 12-step participation (Humphreys, Mankowski, Moos, & Finney, 1999). Recovering persons consistently report that being around non-using peers is important to their recovery. Peers

who are actively working on being in recovery, such as 12-step members, can act as role models and provide strategies to overcome successfully temptations to use; they can give hope that recovery is attainable, and teach skills to relate to drug-free and non-addicted persons. In this study, participation in 12-step fellowships (meeting attendance and engaging in 12-step suggested activities) did not predict commitment to abstinence in multivariate analyses although it did reach significance in bivariate analyses. A possible explanation for this unexpected finding is that the influence of friends/associates who are 12-step members may be greater than that of other 12-step members one may hear or encounter speak at meetings but not know personally; observing friends' commitment to abstinence in all aspects of their daily life (e.g., choice of activities, coping strategies, associates) is likely to inform and to reinforce one's own motivation as well as to provide a model if/when temptations to drink or to use drugs arise. In clinical practice, clients should be encouraged to build a support network consisting of non substance users, including 12-step members and individuals who do not have a substance use problem.

Several gender-specific findings emerged. First, overall, women in this sample had a somewhat less severe clinical profile than did men – fewer prior treatment episodes and fewer being mandated to the index episode; perhaps as a result, they also reported more positive treatment experiences: longer stays and higher overall treatment helpfulness ratings, and higher abstinence self-efficacy; they also reported higher levels of commitment to abstinence at the end of treatment. Second, perceived stress emerged as a negative predictor of commitment to abstinence among women only, though no gender differences in stress levels were observed. The role of stress in substance use is well known (Goeders, 2003; Sinha, 2008). Women with substance use problems often have fewer resources (e.g., employment, education, and income) than men (United Nations Office of Drugs and Crime, 2004) and among socially disadvantaged substance-using women, unlike in other populations (Caplan & Caplan, 2000), social support does not buffer stress (Mulia, Schmidt, Bond, Jacobs, & Korcha, 2008). Therefore in addition to identifying sources of stress with individual clients (men and women) and to provide strategies to minimize overall stress, it is important that clinicians also help clients develop strategies and resources to address sources of stress that cannot immediately be minimized (e.g., difficulties surrounding children or other family members). Third, though there were no gender differences in the number of 12-step members in social networks, the domain was significant among men only. Men may be more influenced by their social network ('buddies') and their network during active addiction may have consisted of a larger number of substance users, while women's networks may consist of family members (siblings, relatives).

Finally, the finding that commitment to abstinence decreased slightly from baseline to end of treatment deserves mention. The decrease (Table 1), from 4.07 to 3.86 (on a scale of 1-5) or the equivalent of one-fifth of one scale point, though statistically significant, is small in magnitude and may not be highly *clinically* significant. There are at least two plausible explanations for this change: First, clients are typically in crisis when entering treatment, either because their life has become 'unmanageable' or because they are under strong pressure to enter treatment; that may temporarily inflate their level of motivation for change –not necessarily because they are committed to abstinence per se but because they are committed to have their problem/pressure 'go away.' Second, and the two are not necessarily mutually exclusive, when treatment clients are interviewed at the start of treatment, even by researchers who state explicitly that they are not associated with the treatment program or any other agency that may affect clients' lives (child welfare agencies, housing, parole), clients likely want to appear eager to do well and may thus slightly inflate their ratings on dimensions that they know to be important to clinicians; motivation for abstinence, a central goal of treatment, is one such dimension. From that perspective, self-reported levels commitment to abstinence at baseline may somewhat overestimate true

levels whereas those measured at the end of treatment may be less affected by the above-or not at all- and more representative of an individual's standing on that dimension.

4.2 Study limitations

A number of study limitations must be noted in interpreting results. First, the study sample is relatively small and was recruited at two publicly-funded programs in one city; therefore findings may not apply to clients in other programs, modalities, settings, geographical locations or socioeconomic groups. Note, however, that the present sample composition is rather similar to that of larger studies of drug users in treatment (Dennis, Scott, Funk, & Foss, 2005; Hubbard, Craddock, & Anderson, 2003). Second, although most of the data were derived from standardized instruments, several domains (e.g., stress, quality of life satisfaction) were assessed using a single item. Though such global assessments are reliable indicators of how a person feels and useful prognostic clinical indicators (Ried, Tueth, Handberg, & Nyanteh, 2006), they are somewhat limited. In particular, more comprehensive (multidimensional) standardized measures of QOL such as the World Health Organization's Quality of Life instrument (WHOQOL Group, 1994) can capture the construct more fully and should be used in future studies. Finally, we did not examine during treatment change in the predictor domains as this was outside the scope of this study. We suggest that the domains that emerge as significant predictors of end of treatment commitment to abstinence be assessed at treatment intake and treatment end in future studies; this would help quantify the impact of services on these areas and inform future service development.

4.3 Conclusions

Our study differs in several important ways from that of Diclemente (described earlier) that provided the impetus for our work: the outcome is narrower in focus (commitment to abstinence vs. readiness to change), we examined end of treatment measures rather intake, and our (smaller) sample consisted of polydrug dependent individuals who were, for the most part, members of ethnic under-served minorities; Diclemente's sample was dependent on alcohol, mostly Caucasian and employed. In spite of these differences, our findings are generally consistent with Diclemente's with the exception of substance-use related variables that did not emerge as significant in our study. This may be due to difference in the timing of the assessments and to the focus of the outcome domain. Studies examining motivation as readiness to change, typically assessed at treatment entry, have most often reported findings consistent with 'hitting bottom:' higher problem severity in substance use and related domains –e.g., employment, family, mental health- predict higher motivation to change. Our findings may initially appear inconsistent with this line of research since here, higher QOL satisfaction and, in bivariate analyses, *lower* problem severity, predict higher motivation for abstinence. We believe however that the two sets of findings can be reconciled: for many, the nefarious consequences of addiction likely need to become 'unmanageable' before help is sought and change initiated- i.e., before hitting bottom. At that early stage, motivation for change is likely driven by and focused on the desire to minimize the problems caused by active use ('being sick and tired of being sick and tired'). As discussed earlier, once help is sought and improvements begin to occur in key areas of functioning, the individual may come to see that abstinence has benefits (enhanced QOL) and that abstinence is required for these gains to endure and accrue. Overall, our findings underline the complex nature of motivational constructs; while we tend to study these constructs as an individual characteristic (is the client motivated?), they are in fact the product of relationships among internal and external circumstances, consistent with DeLeon's CMRS model (see earlier discussion). Half of the variance in the outcome was explained by the domains under study, suggesting that other domains not examined here influence commitment to abstinence at the end of treatment; further research is needed to identify these domains, focusing on areas that

are amenable to change to maximize the usefulness of findings for service development and to clinical practice.

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Table 1

Descriptives of key study domains for the total sample and by gender

	Scale range	Total sample ^a n = 250	Males n = 143	Females ^b n = 107
Demographics and history				
Control variables				
Male gender		56.2%		
Age (years)		39.2 (9.01)	38.7	39.3
Education (years completed)		10.58 (2.12)	10.64	10.50
African American		61.2%	60.8%	63.6%
Hispanic		35.5%	38.0%	33.6%
Commitment to abstinence at baseline	1 – 5	4.07 (.60)	4.01	4.15 ^t
Treatment history				
No. of previous SUD treatment		4.7 (7.2)	5.55	3.38 [*]
Mandated to index episode (yes)		25.2%	32.9%	15.0% ^{**}
In-treatment experiences assessed at the end of treatment				
Treatment experiences				
Length of treatment stay (in days)		153 (89)	139	171 ^{**}
Overall helpfulness of index episode	0 - 10	7.41 (2.74)	7.06	7.88 [*]
Substance use-related domains				
Dependence severity (MINI) since baseline	0 - 14	2.64 (3.68)	3.07	2.06 [*]
Number of days drug problems past month	0 - 30	4.63 (8.79)	5.25	3.79
Cravings/temptation to use drugs	0 – 8	1.79 (2.5)	2.03	1.48
Perceived harm of future drug use	1 - 5	4.56 (.90)	4.52	4.62
Drug abstinence self-efficacy	1 – 5	3.77 (.96)	3.65	3.92 [*]
Psychological functioning				
Perceived stress	0 -10	5.76 (3.05)	5.53	6.07
Quality of life satisfaction	0 -10	7.38 (2.45)	7.00	7.89 ^{**}
Psychological ASI	0 - 1	.22 (.28)	.20	.25
Recovery support resources				
Perceived social support for recovery	1 - 4	2.85 (.32)	2.84	2.85
Number of network members in 12-step		1.4 (3.26)	1.40	1.40
Number of 12-step meetings attended during treatment		33.5 (75.49)	26.5	42.8 ^t
Level of involvement in 12-step activities	0 - 9	2.19 (3.0)	1.99	2.48
Outcome: Commitment to abstinence	1 - 5	3.86 (.64)	3.75	4.0 ^{**}

^t
p<.1*
p <.05**
p < .01***
p<.001

^aPercent or mean (SD)

^bSignificance level of chi square or F test on gender differences

Table 2

Bivariate associations between predictor domains and commitment to abstinence at the end of outpatient treatment: Total sample and Gender subgroups

	Total sample n = 250	Males n = 143	Females n = 107
Control variables			
Male gender	-.19**		
Age (years)	.14*	.14	.13
Education (years completed)	.11	.09	.16
African American	.14*	.12	.17
Hispanic	-.13*	-.09	-.19*
Baseline Commitment to abstinence	.49***	.53***	.38***
Predictor variables^a			
No. of previous SUD treatment at intake	.04	.13	-.09
Mandated to index episode (yes) at intake	-.09	-.10	.03
Length of treatment stay (in days)	.17**	.11	.17
Overall helpfulness of index episode	.24**	.20*	.27**
Dependence severity (MINI) since baseline	-.15*	-.07	-.25**
Number of days drug problems past month	-.16*	-.10	-.25*
Cravings/temptation to use drugs	-.16*	-.15	-.15
Perceived harm of future drug use	.43***	.48***	.33**
Drug abstinence self-efficacy	.52***	.51***	.51***
Perceived stress	-.18**	-.20*	-.20**
Quality of life satisfaction	.32***	.26**	.37***
Psychological ASI	.05	.08	-.07
Perceived social support for recovery	.36***	.36***	.38***
Number of network members in 12-step	.32***	.33***	.31**
Number of 12-step meetings attended during treatment	.19**	.21*	.14
Level of involvement in 12-step activities	.34***	.33***	.33***

† p < .1 [trend]

* p < .05

** p < .01

*** p < .001

^a Assessed at treatment end with the exception of prior treatment history and mandated status that were assessed at baseline

Table 3

Regression coefficients of significant predictors of commitment to abstinence at the end of outpatient treatment: Total sample and Gender subgroups

	Total sample n = 250	Males n = 143	Females n = 107
Control variables			
Baseline Commitment to abstinence	.29***	.33***	.25**
Male gender	-.11 ^t		
Predictor variables (end of treatment)			
Perceived harm of future drug use	.16***	.14**	.19***
Drug abstinence self-efficacy	.23***	.24***	.29***
Perceived stress	n.s	n.s	-.03*
Quality of life satisfaction	.03*	n.s	n.s
Number of network members in 12-step	.02*	.02*	n.s
F	39.54***	31.79***	19.62***
Adjusted R ²	.496	.481	.424

^t
p<.1

*
p <.05

**
p < .01

p<.001