



## Predictors of engagement in continuing care following residential substance use disorder treatment

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### Abstract

**Background:** Patients in intensive SUD programs who subsequently participate in continuing care for a longer interval have better outcomes than those who participate for a shorter interval. We sought to identify patient and program factors associated with duration of engagement in SUD continuing care after residential/inpatient treatment.

**Methods:** Patients ( $n = 3032$ ) at 15 geographically diverse SUD residential treatment programs provided data on demographics, symptom patterns, recovery resources, and perceptions of treatment environment. We identified patient characteristics associated with the number of consecutive months of engagement in continuing care. We then consolidated and classified risk factors into an integrated model.

**Results:** Being African American, having more SUD and psychiatric symptoms, more resources for recovery, and perceiving the treatment staff as being supportive were associated with longer engagement in continuing care. African Americans' engagement in continuing care was 17% longer than Caucasians'. The positive effect of being African American was partially mediated by having taken actions toward changing use, and by the presence of psychotic symptoms.

**Conclusion:** These results extend previous research on the predictors of continuing care engagement after residential SUD programs. Clinicians can use information about characteristics that put patients at risk for shorter engagement in continuing care to target patients who might benefit from interventions to increase engagement in continuing care.

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### 1. Introduction

The U.S. Department of Veterans' Affairs (VA), U.S. Department of Defense, and American Psychiatric Association's clinical practice guidelines for the management of substance use disorders (SUD) recommend that, following intensive treatment episodes, SUD patients should participate in less intensive outpatient treatment, termed continuing care (American Psychiatric Association, 1995; Department of Veterans Affairs Office of Quality and Performance 2004). These guidelines are based on accumulating evidence that SUD patients in intensive treatment programs who subsequently participate in continuing care of longer duration are more likely to abstain from drugs and alcohol, have fewer substance use problems, and have lower arrest

rates at 1-year follow-up than those who either do not obtain continuing care or who participate in such care for a shorter duration (e.g., Gilbert, 1988; Ito and Donovan, 1990; Walker et al., 1983; Peterson et al., 1994; McKay et al., 1996; Sannibale et al., 2003; Ouimette et al., 1998; Moos et al., 2001a; Ritscher et al., 2002a,b; Moos and Moos, 2003).

The purpose of continuing care is to solidify and maintain progress achieved within intensive treatment and to prevent relapse. Engaging patients in continuing care after intensive treatment is an important goal, but it is difficult to achieve. For example, in the VA Health Care System, less than 10% of SUD patients treated in inpatient and residential programs have a continuing care visit within 3 days of discharge, and less than 50% of SUD patients have two or more outpatient SUD visits within 30 days of discharge from intensive outpatient treatment (Harris et al., 2005). However, there is substantial variability within and between programs in terms of the success in achieving these goals, suggesting that both patient and program

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factors are important determinants of engagement in continuing care.

The primary goal of the present study is to identify patient and program characteristics that predict length of engagement in continuing care. Knowing more about the patient factors associated with continuing care engagement can help clinicians target retention efforts to patients who need it most. Information about the program factors associated with continuing care engagement can help managers and clinicians identify potential programmatic improvements.

### 1.1. Previous research

Prior research on SUD patients' continuing care has focused on the association between engagement in or duration of continuing care and patient outcomes. As already noted, evidence from observational studies indicates that longer duration of continuing care is associated with a variety of desirable outcomes. However, far fewer studies have focused on identifying the factors that predict engagement in or duration of continuing care.

In a study of VA patients who completed a 4-week intensive outpatient SUD treatment program and expressed interest in formal aftercare, McKay et al. (1996) found that only remission from cocaine and alcohol dependence during intensive treatment and higher AIDS risk behavior scores significantly predicted more engagement in continuing care in the 3 months after treatment. Patients were offered two continuing care sessions per week and 84% attended at least one session and 60% attended two sessions in the final week of the first month after discharge. These rates of continuing care attendance, which are on the high end of the spectrum within the VA system, may be partially explained by the eligibility criterion that patients needed to be interested in participating in continuing care.

In a study of continuing care after alcohol detoxification, Castaneda et al. (1992) found that 43% of patients engaged in either inpatient or outpatient continuing care after discharge. Better education and employment history prior to admission were associated with initiation of continuing care; higher cognitive flexibility was associated with greater frequency of continuing care attendance. Also, longer inpatient stays predicted continuing care completion.

Schaefer et al. (2005) examined whether patient factors (demographics, SUD severity, treatment history, motivation) and treatment practices thought to increase continuing care engagement (e.g., coordination of care, maintaining contact with patients, connecting patient to community resources, continuity of treatment providers) predicted length of engagement in continuing care, as measured by the number of consecutive months following intensive treatment in which a patient had two or more SUD or psychiatric continuing care clinic visits and no inpatient SUD or psychiatric readmissions. Predictors of length of engagement in continuing care varied depending on whether the index treatment episode was in an outpatient or inpatient/residential setting. This is not surprising given that the transition from inpatient treatment to outpatient continuing care

often involves a change of treatment staff, location, and less-than-perfect coordination between these branches of treatment. Also, patients who receive inpatient care may differ in important ways from those receiving outpatient care, such as on severity of SUDs.

For SUD patients treated in intensive outpatient settings, more motivation for treatment, lower Addition Severity Index (ASI) Alcohol scores at entry into treatment, more SUD and psychiatric visits in the preceding year, and successful completion of treatment predicted more consecutive months of engagement in continuing care. Among inpatients, only older age and more motivation for treatment predicted longer engagement in continuing care. One explanation offered as to why continuing care was more difficult to predict in the inpatient sample was that there may have been a lack of statistical power due to the smaller sample sizes, both in terms of numbers of patients and numbers of programs. Also, observations were more highly correlated within the inpatient compared to the outpatient programs (intra-class correlation = 0.15 versus 0.04), further reducing the effective patient-level sample size for inpatient programs (Raudenbush and Bryk, 2001).

Overall, these studies highlight the challenges both of engaging patients in continuing care after SUD treatment and of identifying patient and program characteristics associated with engagement in continuing care. Especially for patients in inpatient and residential SUD programs, where rates of engagement in continuing care are low, we know very little about the characteristics of patients and programs associated with continuing care engagement.

The primary aims of the present study were to identify patient and program factors linked to SUD continuing care after residential/inpatient treatment and to begin to develop an integrated model of continuing care engagement. Such a model developed from observational data cannot establish or confirm causal relations, but can generate hypotheses about causal relationships that may be tested in randomized trials. In addition to re-examining many of the indexes previously shown to predict continuing care engagement, we examined patient factors such as race, coping, and social resources, and program factors such as treatment orientation and environment that have been relatively overlooked in previous research. We also had a specific interest in the influence of race on engagement in continuing care. Other studies have found differences between African Americans and Caucasians in the process and outcome of SUD treatment (e.g., Moos et al., 2001b); however, no research has examined racial differences in continuing care engagement.

Elaborating on Anderson's model of help seeking (Anderson and Newman, 1973, Andersen, 1995), we conceptualized candidate predictors in the following four categories: (a) predisposing characteristics, that is those existing prior to the onset of a disorder and influencing patients' propensities for service use (e.g., race, education), (b) need-related characteristics, such as disorder severity, (c) recovery resources and barriers, such as motivation for treatment, social support, and employment status, and (d) treatment characteristics, such as treatment orientation.

## 2. Methods

### 2.1. Participants

Patients at 15 geographically diverse VA SUD residential treatment programs were medically detoxified and invited to participate in an evaluation of treatment effectiveness. The multidisciplinary, residential treatment programs lasted 28 days and used individual and group therapy. Women were excluded from the project because of their small numbers ( $n = 64$ ). In each program, consecutive admissions were approached, unless it was determined that the patient volume would be in excess of data collection capabilities. If so, a sampling procedure was implemented in which every other admission or every third admission was recruited. A total of 4193 patients were invited to participate (90% of those eligible); the other 10% left the program-before completing detox or were not invited to participate because of scheduling problems.

There were 3450 male patients with SUDs (82% of those invited) enrolled in the study at intake; of these, 12% ( $n = 418$ ) left the program prior to completing it. Baseline factors that predicted dropout included younger age, greater cognitive dysfunction, more drug use, and lower severity of alcohol dependence (McKellar et al., *in press*). As subsequent care received by the patients who did not complete treatment cannot be considered continuing care by our definition, we focused on the 3032 patients who completed treatment. The number of patients per program ranged from 110 to 279.

### 2.2. Measures

An Intake Information Form (IIF) assessed predisposing characteristics, need factors, and recovery resources and barriers at treatment entry. The IIF was a self-report questionnaire that assessed the domains described below and is more fully detailed in prior articles (e.g., Ouimette et al., 1997; Ritscher et al., 2002a,b). Internal consistencies (Cronbach's alphas) reported below were derived from the intake data from this study. Patients' perceptions of the treatment environment were assessed by questionnaire at discharge. Data on patients' care received prior to the index treatment episode and engagement in continuing care were accessed through the VA's administrative medical databases.

#### 2.2.1. Primary outcome.

**2.2.1.1. Consecutive months of engagement in continuing care.** The primary outcome of this study was a count of the consecutive months (0–12) a patient attended two or more outpatient SUD clinic visits during the year after discharge from the intensive residential program. This information was obtained from administrative data. If a month lapsed without at least two visits, the patient could not accumulate more months.

**2.2.2. Predisposing characteristics.** Patients provided data on age, race, education, and employment status.

#### 2.2.3. Need-related characteristics.

**2.2.3.1. Prior Service utilization.** Information regarding SUD and mental health service utilization for the year prior to intake was obtained from administrative data.

**2.2.3.2. Frequency of alcohol and drug use.** The frequency of alcohol use was assessed by how often in the past 3 months patients used alcohol, with five response options (0 = never, 1 = less than once a week, 2 = 1–3 days a week, 3 = 4–6 days a week, 4 = every day). Frequency of drug use was assessed by how often in the past 3 months patients used their drug of choice, with five response options (0 = never, 1 = less than once a week, 2 = 1–3 days a week, 3 = 4–6 days a week, 4 = every day). Drug of choice was the substance that at the intake assessment patients reported taking most frequently.

**2.2.3.3. Quantity of alcohol use.** Quantity of alcohol use in the past 3 months was assessed using items adapted from the Health and Daily Living Form (Moos et al., 1992). Patients' reports of quantity of alcohol use reflect the average and maximum amounts of alcohol (beer, wine, or hard alcohol) consumed on a drinking day.

**2.2.3.4. Severity of alcohol dependence.** Levels of alcohol dependence were measured by patients' responses to nine questions derived from the nine DSM-III-R (American Psychiatric Association 1994) criteria for alcohol dependence (each scaled from 0 = never to 4 = almost every day). Examples of items include "During the past 3 months, how often did you ... have more to drink than you expected?, or ... take a drink to relieve a hangover, or to keep from going into withdrawal?" Scores on this scale range from 0 to 36 ( $\alpha = 0.94$ ).

**2.2.3.5. Substance-related problems.** The Problems From Substance Use scale (Ouimette et al., 1997) was used to tap problems in health, legal, monetary, occupational, and intra- and interpersonal, and residential domains. Examples of items include "In the past 3 months, how often have you had the following problems or experiences as a result of your drinking and/or drug use ... Arguments with your spouse or partner?, Hit someone?, Problems with your job?" The 15 items are scored on a five-point scale ranging from 0 (never) to 4 (often) ( $\alpha = 0.88$ ).

**2.2.3.6. History of suicidality.** Questions assessed patients' recent (within 3 months) and lifetime history of suicidal thoughts and attempts.

**2.2.3.7. Psychiatric symptoms.** Twenty-two items from four subscales (depression, anxiety, paranoia, and psychoticism subscales;  $\alpha$ s = 0.88, 0.87, 0.80, and 0.76, respectively) of the Brief Symptom Inventory (Derogatis, 1993) were used to measure psychiatric symptoms; each item was rated on a five-point scale (0 = not at all to 4 = extremely).

#### 2.2.4. Recovery resources and barriers.

**2.2.4.1. Motivation.** Motivation was measured using the Stages of Change Readiness and Treatment Eagerness Scale (Miller and Tonigan, 1996), which was adapted from the Stages of Change Scale (DiClemente and Hughes, 1990). Of the five subscales of this 20-item instrument, only the Action and Determination subscales had sufficiently high reliability (alphas = 0.74 and 0.73, respectively). The Action subscale contains four questions like “I’m not just thinking about my drinking and/or drug use, I’m already doing something about it.” The Determination subscale contains four questions like “I definitely have some problems related to my drinking and/or drug use.”

**2.2.4.2. Thoughts and beliefs about alcohol and drug use.** Each patient was asked about treatment goals (total abstinence, no goals, other goals), alcoholic or addict identity, as well as about abstinence self-efficacy (one item) and self-efficacy in preventing relapse (Miller et al., 1989; 14 items; alpha = 0.96).

**2.2.4.3. Positive and negative expectancies for continued use.** Twelve items assessed the patients’ reinforcement expectancies for consuming alcohol or drugs (alpha = 0.82). Based on the original factor loadings, two items from each of the six subscales of the Alcohol Expectancies Questionnaire (Brown et al., 1980) were chosen and modified to include both positive and negative expectancies for drug and alcohol use.

**2.2.4.4. Positive and negative expectancies for quitting.** Twelve items assessed the patients’ outcome expectancies for reducing or eliminating substance use, yielding both benefits-of-quitting (alpha = 0.85) and costs-of-quitting scores (alpha = 0.69). The items were taken from the Outcomes Expectancies Scale (Solomon and Annis, 1989) and modified for use with participants who abuse alcohol and/or drugs.

**2.2.4.5. Social resources and stressors.** Twenty-two items from Life Stressors and Social Resources Inventory (LISRES: Moos and Moos, 1997) were used to assess resources and stressors related to partners (alphas = 0.82 and 0.75, respectively) and resources and stressors related to friends (alphas = 0.90 and 0.73, respectively).

**2.2.4.6. Religious beliefs and behaviors.** The Religious Beliefs and Behaviors Scale (Tonigan and Miller, 1992) asks patients about their religious beliefs, how often they have engaged in a number of religious activities in the past 12 months (0 = never; 8 = more than once a day), and whether they have engaged in those activities at any point in their life (1 = never, 2 = yes but not now; 3 = yes, and I still do).

**2.2.4.7. Coping.** Twenty-four items from four subscales of the Coping Responses Inventory (Moos, 1993) were used to assess the orientation (approach or avoidance) and the method (cognitive or behavioral) of responding to a stressful life experience.

The Positive Reappraisal subscale (alpha = 0.76) contains questions such as “Did you tell yourself how much worse things could be?” The Take Problem-Solving Action subscale (alpha = 0.79) contains questions such as “Did you try at least two different ways to solve the problem?” The Cognitive Avoidance subscale (alpha = 0.75) contains questions such as “Did you try to forget the whole thing?” The Emotional Discharge subscale (alpha = 0.63) contains items such as “Did you cry to let your feelings out?”

**2.2.4.8. Cognitive functioning.** Cognitive functioning was measured with 20 items from the Abstraction subscale of the Shipley Institute of Living Scale (Shipley, 1940). For each item, patients were presented with a logical sequence and asked to fill in the numbers or letters that best completed the sequence. Higher scores indicate better cognitive functioning.

#### 2.2.5. Treatment characteristics.

**2.2.5.1. Treatment orientation.** Programs were selected because they employed either a Cognitive Behavioral (CB), 12-step, or eclectic (combined 12-step and CB) approach (see Ouimette et al., 1997 for more details about the program selection process). Then, a two-step empirical approach was used to verify/classify the programs by treatment orientation. First, the program directors were surveyed regarding the number of treatment hours devoted to 12-step activities (e.g., 12-step meeting, turn their lives over to a higher power to achieve or maintain sobriety) and CB activities (e.g., acquiring new skills such as stress management, communication skills, coping skills, and assertive behavior). Also, the program directors completed the Drug and Alcohol Program Treatment Inventory (DAPTI; Swindle et al., 1995) that asks about therapeutic goals and activities that are characteristics of 12-step and CB programs. From these data, five programs were classified as 12-step, five as CB, and five as eclectic. Then, these classifications were successfully verified by examining responses of 327 staff members in the 15 programs to the DAPTI (for more details of this classification procedure, see Finney et al., 1998).

**2.2.5.2. Treatment environment.** Patients’ perceptions of the supportiveness of the treatment environment and level of control exerted by program staff were measured using the two subscales of the Community Oriented Programs Environment Scale (COPEs; Moos, 1996). The 10-item Support subscale measures the extent to which program staff members are perceived as encouraging, caring, helpful, and empathic to patients (Cronbach’s alpha = 0.78). A sample item indicative of support is, “The staff go out of their way to help new patients get acquainted here.” The 10-item Staff Control subscale measures the extent to which program staff strictly enforce rules and penalize patients for not following rules (average alpha = 0.64). An item indicative of higher levels of staff control is: “Patients who break the rules are punished for it.” Both patient-level responses on these two subscales and program-level averages were considered as candidate predictors.

### 2.3. Analytic strategy

The first goal was to identify patient and program characteristics that were associated with engagement in continuing care in univariate, multi-level, log-linear regression models. All of the variables described above were considered candidate risk factors. These mixed-effect regression models account for the correlated nature of observations within program and allow modeling of patient level (level 1), program level (level 2), and cross level effects (Raudenbush and Bryk, 2001). The main software used for the Poisson multilevel modeling was R (R Development Core Team, 2005), specifically glmmPQL function in the MASS library (Venables and Ripley, 2002).

After identifying individual patient and program characteristics linked to engagement in continuing care, we employed a taxonomy and strategy developed by Kraemer et al. (2001, 2005) for consolidating, organizing, and classifying risk factors into an integrated and useful model. As a foundation, they offer the following definitions: (a) *Risk factors* are characteristics that precede and are correlated with the outcome within a specific population. Although one might call correlates of desirable outcomes *protective factors*, we refer to all such factors as *risk factors* regardless of the outcome. (b) A *Proxy risk factor* is correlated with another risk factor, there exists no time precedence (or the proxy follows the other risk factor), and when evaluated simultaneously in a model predicting the outcome, the proxy is not significant. For example, olive consumption may be a proxy risk factor to daily number of drinks in predicting problems from alcohol use. This is to say that once we know the daily number of drinks, knowing about olive consumption does not help us further predict problems from alcohol use. (c) *Overlapping risk factors* measure the same underlying construct and are redundant to some degree. Overlapping risk factors are operationally defined as correlated risk factors with no time precedence, that are independently predictive of the outcome (or the interaction term is significant) in the same model. (d) A *Moderator* is a risk factor that precedes another risk factor and alters its relationship with the outcome. Moderators must be uncorrelated with the risk factors they precede, and within subgroups defined by the moderator, the “downstream” associations are altered. (e) A *mediator* is a risk factor that occurs after another risk factor, is correlated with it, and when both are used to predict an outcome, either both risk factors are significant (partial mediation) or only the mediator matters (total mediation).

After identifying risk factors, we use the following strategy as suggested by Kraemer et al.: (a) sort the risk factors into time periods. (b) Within each time period, identify and set aside proxy risk factors and combine overlapping risk factors. (c) Identify and set aside proxy risk factors across time periods. (d) Identify moderators. If found, split the data on the moderator and start the process at the beginning. (e) Within moderated subgroups, identify mediator chains.

### 3. Results

The patients were African American (51.4%) or Caucasian (48.6%) males. At intake, 44% had both alcohol use and drug

use disorder diagnoses, 42% had only a alcohol use disorder diagnosis, and 14% had only a drug use disorder diagnosis. Eighteen percent of the patients were married. The patient's average age was 43 years (S.D. = 9.6) they had an average of 12.7 years (S.D. = 1.8) of education. Most patients (79%) were unemployed, their average income (past 12 months) was US\$ 10,620 (S.D. = US\$ 9457). For the entire sample, the number of consecutive months of two or more SUD visits was Poisson-distributed with a mean of 1.23 months (S.D. = 2.46). Over half (59.4%) of the patients did not engage in two or more outpatient SUD treatment visits during the first post-treatment month, 17.5% had two or more outpatient SUD treatment visits only during the first post-treatment month, 7.7% had 2 consecutive months and 15.4% had more than 2 consecutive months of engagement in continuing care.

When tested within univariate mixed-effects Poisson regression models predicting number of consecutive months of continuing care, 14 variables emerged as significant risk factors, although several were highly correlated. Candidate variables (described in Section 2) found not to be significant predictors of the outcome were not considered further (e.g., coping, education, etc.). As noted previously, the first step in developing a simplified and integrated model is to sort risk factors by time period. Categorizing the risk factors into time periods had no completely satisfying solution. To address this challenge, we followed the advice of Kraemer et al. (2005) and assigned each characteristic to the time period in which it was assessed unless it indisputably belonged to another time period. For example, race was assessed at intake but clearly can be considered existing prior to the onset of the disorder. On the other hand, we cannot be sure about how to assign cognitive functioning assessed at intake to a time period, so it was assigned to the time period in which it was assessed.

We identified four relevant time periods: (a) pre-existing, which included race (Caucasian, African American), (b) pre-intake, which included prior SUD-related service utilization, (c) intake, which included all other risk factors assessed at intake regardless of whether they documented status at intake or retrospectively reported status during the months prior to intake. (d) Patient rating of staff support was considered discharge risk factor.

Then, we identified and set aside proxy risk factors and consolidated overlapping risk factors within each time period. Recall that Risk Factor A is a proxy to Risk Factor B when, in a regression model containing the main effects for both risk factors and their interaction, only the coefficient for Risk Factor B is significant. Four correlated risk factors assessed at intake related to patterns of alcohol consumption and dependence symptoms: Alcohol Dependence Symptoms, Usual Amount of Alcohol Consumed on a Drinking Day, Maximum Daily Alcohol Consumption, and Frequency of Alcohol Use. For the purposes of predicting engagement in continuing care, the first three variables were found to be proxy risk factors to Frequency of Alcohol Use, and were therefore omitted from subsequent analyses. Of risk factors related to motivation and goals for treatment, Having No Goal for Treatment was found to be a proxy for the Action subscale of the Stages of Change Readiness and Treat-

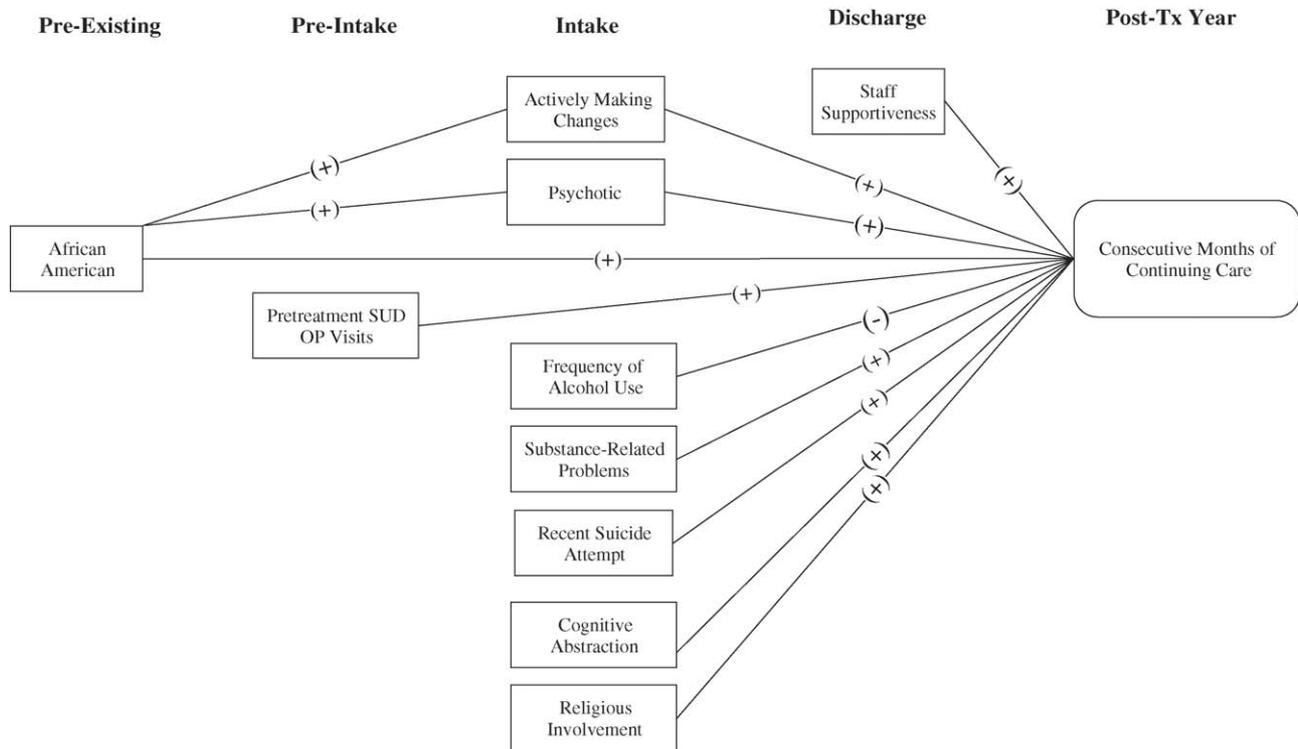


Fig. 1. Risk (–) and protective (+) factors for engagement in consecutive months of continuing care.

ment Eagerness Scale, and was therefore set aside in further analyses. We checked for significant moderator effects among the 10 remaining risk factors and found none.

An integrated model using the remaining 10 risk factors to predict engagement in continuing care is presented in Table 1. Being African American, having more pretreatment outpatient SUD clinic visits, lower frequency of alcohol use, more substance-related problems, and having recently attempted suicide all were associated with longer engagement in continuing care. Already having taken actions toward changing substance use patterns, better cognitive functioning, more religious involvement, and perceiving the treatment staff as being more supportive were also associated with longer engagement

in continuing care. Higher psychotic symptoms, a significant univariate predictor of engagement, was marginally significant ( $p = 0.06$ ) in the integrated model. The magnitude of these effects can be estimated from the coefficients in Table 1. Poisson regression coefficients are the percentage change in the outcome for every increment in the predictor. For example, every additional pretreatment outpatient visit is associated with a 17.3% increase in months of consecutive continuing care.

Finally, we examined if any of these risk factors were partially mediated by subsequently occurring risk factors. For a risk factor A to be mediated by risk factor B, among other criteria, A must precede B and be correlated with it. We first focused on potential mediators of race, specifically psychotic symptoms, cognitive functioning, and the active motivation for change, as these were the only risk factors correlated with race. We found that the positive effect of being African American on continuing care engagement was partially mediated by both motivation for change and psychotic symptoms, on which African Americans were significantly higher than Caucasians. Each of these indexes reduced the effect of being African American by 5%; the one-tailed significance tests of the indirect effects were  $Z = 2.15$ ,  $p = 0.016$  and  $Z = 1.86$ ,  $p = 0.030$ , respectively. Therefore, these factors explain only a small part of African Americans' significantly longer engagement in continuing care compared to Caucasians. Fig. 1 presents a graphic view of our final model.

#### 4. Discussion

These results support and extend previous research on predictors of continuing care engagement after treatment in residential

Table 1  
Ten predictors of consecutive months of continuing care of patients after residential SUD treatment at 15 sites<sup>a</sup>

Effect	Beta	S.E.	<i>t</i>	<i>p</i> -Value
African American vs. Caucasian	0.236	0.084	2.82	0.0049
Pretreatment SUD outpatient visits	0.173	0.080	2.16	0.0305
Alcohol use frequency	–0.170	0.049	–3.46	0.0005
Substance-related problems	0.021	0.009	2.37	0.0179
Recent suicide attempt	0.316	0.127	2.48	0.0130
Psychotic symptoms	0.015	0.008	1.88	0.0599
Active motivation for change	0.041	0.017	2.40	0.0166
Cognitive functioning	0.015	0.004	3.88	0.0001
Religious beliefs and behaviors	0.036	0.014	2.61	0.0092
Supportive treatment environment	0.048	0.018	2.76	0.0058
Intercept	0.015	0.183	0.08	0.931

<sup>a</sup>Results are from a mixed-effect Poisson regression model with program ( $n = 15$ ) used as a random grouping variable. All variables mean-centered.

SUD programs. As in the present study, [Castaneda et al. \(1992\)](#) also found that inpatients with greater cognitive flexibility and more personal resources engaged in more continuing care, and [Schaefer et al. \(2005\)](#) found that inpatients with more motivation for treatment engaged in more continuing care. In the present study, several other patient factors were found to predict length of engagement in outpatient continuing care after completion of intensive residential SUD treatment. Of the predisposing characteristics considered, only being African American predicted longer engagement in continuing care, an effect that was partially mediated by higher scores on motivation for change and psychotic symptoms.

Of the need-related characteristics considered, lower frequency of alcohol use and high levels of distress (substance-related problems, recent suicide attempt, and marginally psychotic symptoms) were associated with more consecutive months of continuing care. Of the resources and barriers to recovery considered, being motivated and active in making changes, including engagement in outpatient SUD care prior to residential treatment, were associated with more consecutive months of engagement. Also, having been involved in religious activities or having held religious beliefs, and having more cognitive abstraction ability, were associated with more consecutive months of engagement.

That low-severity, high distress and high motivation are associated with longer engagement in continuing care is fairly intuitive. However, why religious involvement and cognitive abstraction predict longer engagement in continuing care is somewhat less obvious. To the extent that religious involvement is an existential/social/motivational resource, it may act as a scaffold for recovery efforts, including engagement in continuing care. Cognitive ability has been found in other studies (e.g., [Castaneda et al., 1992](#)) to predict engagement in continuing care, although the mechanism underlying the association is unclear. Greater cognitive ability may enhance a patient's understanding of risks of continued substance use and allow them to benefit more from certain treatment approaches that require more abstraction abilities (e.g., CB therapies), both of which might increase motivation for treatment including continuing care. These are speculations at this point.

When individual patient ratings of staff supportiveness were considered as patient-level factors, they were associated with longer continuing care engagement. Modeled in this way, we are examining individual patients' perceptions of staff supportiveness above and beyond average between-program differences in supportiveness. We also analyzed staff supportiveness and control as program-level factors by averaging the patient ratings within each program. These higher-level factors did not predict engagement, possibly due to the low number of sites ( $n = 15$ ) and the relatively high within-site variability. Other site-level characteristics, such as treatment orientation, were also non-significant. Future studies of site-level effects would benefit from including more sites and more diverse site-level characteristics, such as patient-to-staff ratios, average length of stay, or the presence of dual diagnosis programs.

Other studies have found differences between African Americans and Caucasians in the processes and outcomes of SUD treat-

ment, however the valance of the differences has been mixed. For example, [Moos et al. \(2001a\)](#) found that African Americans were more likely than other patients to experience escalation of symptoms during treatment. [Kaskutas et al. \(1999\)](#) found that African American patients reported more drug and employment problems than Caucasians, but fewer family problems. On the other hand, African Americans were twice as likely to report having attended AA as part of treatment. Similarly, [Humphreys et al. \(1991\)](#) found that African Americans were more likely to attend AA after treatment.

We found that being African American was associated with significantly longer engagement in continuing care, an effect that was partially explained by the fact that African Americans were more active in their process of change and had more psychotic symptoms upon entry to residential treatment. However, even after accounting for these mediating effects, being African American was still independently associated with longer continuing care engagement. Race was not a proxy for other socio-demographic factors: education and employment were not found to be significant predictors of length of engagement, therefore do not explain the effect of race in this study.

#### 4.1. *Clinical implications*

Single observational studies cannot establish causal relations among risk factors and outcomes, but they can suggest potential targets for future research or clinical applications. The main clinical application of this research is to identify patient characteristics associated with shorter engagement in continuing care in order to make extra efforts to engage these patients. For example, our results suggest that patients who are Caucasian, are low in distress and perceived problems from substance use, previously uninvolved in outpatient SUD care, use alcohol frequently, and not currently taking action to make changes are less likely to engage in continuing care. Perhaps patients who are not actively making changes or lack motivation for change would benefit from clinical efforts to target these characteristics early in the course of treatment. Research by [Brown and Miller \(1993\)](#), who tested motivational interviewing as a preparation for residential alcoholism treatment, supports this notion. In their study, patients were randomized to receive or not to receive a two-session motivational assessment and interview shortly after intake. Patients who received the motivational interview participated more fully in treatment and showed significantly lower alcohol consumption at a follow-up interview. Although engagement in continuing care was not assessed in their study, brief motivation enhancement interventions may help low-motivation patients engage more fully in both intensive and follow-up treatment.

#### 4.2. *Limitations*

We examined the predictors of continuing care engagement after residential/inpatient SUD treatment, an increasingly rare treatment modality. As this study focused specifically on male African American and Caucasian patients within VA programs, it is unknown to what extent the results generalize to other

samples. Although we were able to identify more patient-level predictors of continuing care for residential SUD patients than previous studies, our attempt to identify program characteristics associated with continuing care engagement was unsuccessful. We do not know if our failure to find program-level effects was due to low power or low potency of the program-level effects we investigated. Future studies of program-level effects will need more sites to adequately address these questions. It is also worth noting that our measures of treatment environment (COPEs Support and Control) are based only on perceptions of patients who completed the program, possibly introducing some bias to these results.

#### 4.3. Conclusions and directions for future research

We identified 10 characteristics predictive of length of engagement in continuing care after residential SUD treatment in a sample of African American and Caucasian males. These findings can help clinicians target patients who are at risk for suboptimal engagement and who might benefit from extra support and encouragement to attend continuing care appointments. The next steps in this overall line of research are to identify other mediators of the effect of race on continuing care, and to find out whether there are racial differences on long-term clinical outcomes, such as substance-related problems, and if differences exist, whether they are mediated by engagement in continuing care.

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