# Measuring Readiness-to-Change Substance Misuse Among Psychiatric Outpatients I. Reliability and Validity of Self-Report Measures

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## Abstract

**Objective**—The high rates of comorbid substance use disorders among persons living with severe and persistent mental illness (SPMI) have increased interest in assessing and enhancing motivation to change substance misuse in this population. This study provides evidence for the psychometric adequacy of three self-report measures of readiness-to-change.

**Method**—The sample consisted of 84 persons (65% men) with co-occurring substance abuse or dependence and an SPMI. After a psychiatric assessment, participants completed three measures of readiness-to-change, which yielded seven subscales: (1) the Stages of Change Readiness and Treatment Eagerness Scale (ambivalence about change, recognition of substance-related problems, taking steps), (2) Decisional Balance Scale (pros of using, cons of using) and (3) the Alcohol and Drug Consequences Questionnaire (costs of quitting, benefits of quitting).

**Results**—All of the subscales were stable over time, and 6 of the 7 subscales demonstrated excellent internal consistency. Reliability indices were comparable when analyses were repeated on subsets of participants defined by diagnosis, cognitive function, positive symptoms and negative symptoms. A pattern of theoretically meaningful intercorrelations provided convergent evidence of validity, and a general lack of relationships with demographic variables and indices of psychiatric status provided discriminant evidence of validity. These findings support efforts to quantify readiness-to-change substance misuse among persons with an SPMI.

Substance use disorders are highly prevalent among persons with schizophrenia and other major mental illnesses. Persons with major (Axis I) mental disorders have three times the risk of drug or alcohol diagnoses compared to the rest of the population (Regier et al., 1990). Persons with schizophrenia represent a particularly high risk group for problems related to substance use. Among all persons with a diagnosis of schizophrenia, 47% meet lifetime criteria for a substance use disorder (Regier et al., 1990). This prevalence rate is often higher in samples of schizophrenic patients in treatment (Mueser et al., 1990; Test, Wallisch, Allness, & Ripp, 1989).

A diagnosis of substance abuse or dependence impairs both the process and outcome of mental health treatment. Symptom exacerbation and psychiatric admissions have both been linked to acute drug use in outpatients with a severe and persistent mental illness (SPMI), such as schizophrenia (Haywood et al., 1995; Shaner et al., 1995). Individuals enrolled in outpatient treatment and "dually diagnosed" with psychiatric and substance use disorders exhibit poor

medication compliance (Keck, McElroy, Strakowski, Bourne, & West, 1997; Owen, Fischer, Booth, & Cuffel, 1996; Pristach & Smith, 1990), report more severe psychiatric symptoms (Carey, Carey, & Meisler, 1991), and involve themselves minimally in structured treatment programs (Carey & Carey, 1990; Lehman, Herron, Schwartz, & Myers, 1993; Richardson, Craig, & Haugland, 1985). This pattern of poor treatment compliance and exacerbated symptoms leads to greater use of institutional and emergency services, with higher associated costs (Bartels et al., 1993; Kivlahan, Heiman, Wright, Mundt, & Shupe, 1991).

Even consistent participation in psychiatric treatment need not imply that a dually diagnosed person has acknowledged substance use as a problem. Despite continuing substance misuse, treatment relationships are often maintained with dually diagnosed persons in order to monitor medications and manage crises associated with the psychiatric disorder (Carey, 1996; Kofoed, Kania, Walsh, & Atkinson, 1986). One influential model of intervention for dually diagnosed patients proposes that efforts to engage a person in relationships with helping professionals and to persuade him/her to accept substance use reduction as a treatment goal precede involvement in active treatment (Osher & Kofoed, 1989). Toward this end, there is a need to attend to individual differences in motivation, or readiness, to change substance use among persons with a SPMI.

Within the treatment field there is growing recognition that individuals vary in their readiness-to-change (Carey, Purnine, Maisto, & Carey, 1999a). For example, Prochaska and DiClemente (1992) have provided a useful heuristic for understanding varying levels of motivation for change. Within their Transtheoretical Model, they posit five stages to represent the continuous and cyclic process by which people change addictive behaviors (precontemplation, contemplation, preparation, action, and maintenance), and note that the vast majority of persons addicted to substances are not in the action stage (Prochaska & DiClemente, 1992). Even persons admitted to alcohol and drug treatment programs vary in their level of motivation for change (DiClemente & Hughes, 1990; Project Match Research Group, 1997). Consistent with these findings, when Ziedonis and Trudeau administered a staging algorithm to 224 outpatient dually diagnosed with schizophrenia-spectrum and substance use disorders, they found that 50% were in the precontemplation stage with respect to changing their substance use behavior; 2% were in contemplation stage; 8% in preparation; 4% in action; and 36% in maintenance (Ziedonis & Trudeau, 1997). Thus low levels of motivation for changing substance use behavior can be observed within a variety of treatment settings.

Readiness-to-change may be considered a motivational state that is strongly influenced by cognitive, affective, environmental and interpersonal events (DiClemente, 1993). In addition, the notion of decisional balance (e.g., subjective pros and cons, or benefits and costs of a certain behavior) has been identified as a related construct that is a sensitive marker of movement through the early stages of change (Prochaska et al., 1994). Self-report methods have often been used to measure readiness-to-change (Carey et al., 1999a). A considerable literature has developed on the psychometrics of instruments purporting to assess readiness-to-change in substance abusing populations (Carey et al., 1999a). However, little evaluation of basic psychometric indices, such as reliability of measurement and construct validity, has been conducted with persons who have severe mental illness. In this special population of substance users, concerns have been raised regarding the degree to which diagnostic status, cognitive function, or psychotic symptoms may influence the accuracy of a readiness-to-change assessment (Bellack & DiClemente, 1999). For example, deficits in self-awareness or abstract thinking seen in persons with schizophrenia may compromise their ability to self-report interest in and intentions to change. Also, the presence of negative symptoms (e.g., avolition, anergia, and anhedonia) may interfere with the assessment of such motivational constructs as readiness-to-change. For these reasons, it is important to determine empirically whether readiness-to-

change and/or decisional balance can be assessed reliably and validly in dually diagnosed persons.

Only two studies have investigated the measurement of readiness-to-change among persons with dual disorders. Addington and colleagues evaluated 39 outpatients diagnosed with both schizophrenia and substance use disorders (Addington, ed-Guebaly, Duchak, & Hodgins, 1999). These authors found little correspondence between interviewer-assigned stage of change (assessed by an algorithm supplemented by clinician and chart data) and stage derived from the Stages of Change Readiness and Treatment Eagerness Scale (SOCRATES) (Miller & Tonigan, 1996) or the Readiness to Change Questionnaire (Rollnick, Heather, Gold, & Hall, 1992). Kappas for alcohol stage of change ($\underline{n}$=30) were .20 and .08, and kappas for drug stage of change ($\underline{n}$=22) were .38 and .45, respectively. These data are difficult to interpret due to the small sample size and lack of information about how stage assignments were obtained from the self-report scales. Furthermore, the authors of the SOCRATES discourage its use to classify respondents according to stage of change (Miller & Tonigan, 1996), suggesting that the instruments were used in ways other than originally intended.

Velasquez and colleagues (Velasquez, Carbonari, & DiClemente, 1999) also assessed readiness-to-change, decisional balance and other constructs related to the Transtheoretical Model (TTM) in a sample of 132 alcohol-dependent outpatients in a dual diagnosis program. A variety of Axis I disorders was represented in this sample, including major depressive disorder, schizophenia, and bipolar disorder. These investigators reported acceptable alpha coefficients for measures of the pros of drinking (.90), the cons of drinking (.91), and the readiness-to-change score (.91) derived from University of Rhode Island Change Assessment-Alcohol version (DiClemente & Hughes, 1990). This preliminary evidence suggests that the presence of an Axis I mental disorder may <u>not</u> be associated with poor internal consistency of instruments designed to assess readiness-to-change substance misuse. However, test-retest reliability was not assessed in this study, nor were correlations among the decisional balance and readiness variables reported. These investigators merely stated that these intercorrelations "were in the direction and of the magnitude of those found in most other studies" (p. 488) (Velasquez et al., 1999). Taken together, these studies leave unanswered many questions about the ability of persons with schizophrenia and other SPMIs to provide meaningful information regarding their readiness-to-change substance use behavior.

The main purpose of this study was to provide additional empirical evidence on whether readiness-to-change patterns of substance misuse can be measured reliably and validly in a sample of persons dually diagnosed with SPMI and co-occurring substance abuse or dependence. We expanded the assessment of readiness-to-change variables to include the following self-report measures: (a) the Recognition, Ambivalence, and Taking Steps subscales from the SOCRATES, (b) pros and cons of continuing to use substances (from the Decisional Balance Scale; King & DiClemente, 1993), and (c) pros and cons of quitting (from the Alcohol and Drug Consequences Questionnaire; Cunningham, Sobell, Gavin, Sobell, & Breslin, 1997). Psychometric evaluation of these theoretically related constructs may provide tools to enhance our understanding of the generalizability of models of change to different populations of substance users.

We explored the following four research questions. First, we evaluated internal consistency and the temporal stability of the seven readiness-to-change scores. Based on the findings reported by Velasquez et al. (1999) we predicted that these self-report measures of decisional balance and readiness-to-change would be internally consistent. Because motivational variables are considered to be changeable over time and responsive to both therapeutic and naturally-occurring events (DiClemente, 1993; Miller & Rollnick, 1991), we chose a relatively brief interval (less than one week) for evaluating temporal stability. We had no basis for

predictions regarding test-retest reliability. Second, we evaluated the extent to which psychiatric diagnosis (schizophrenia vs. mood disorder), cognitive status, and positive and negative symptoms influenced the reliability indices. These analyses were exploratory, and we did not have empirical precedent for a priori predictions.

Third, we assembled convergent evidence for the validity of the motivational measures, based on the pattern of relationships among the 7 scale scores. Within each instrument, we compared our intercorrelations with that of the scale developers and others. For example, we expected a positive correlation between the Recognition and Taking Steps subscales from the SOCRATES, and negative correlations between subscales of the two decisional balance measures. In addition, we made the following predictions, based on theoretical relationships among these constructs: (1) we expected positive correlations between complementary constructs, (i.e., the Pros of Using and Costs of Quitting, and the Benefits of Quitting and Cons of Using); (2) we expected positive correlations between the Recognition scale and Cons of Using and Benefits of Quitting; and (3) we expected the Taking Steps scale would be positively related to Benefits of Quitting and negatively related to Costs of Quitting. Finally, discriminant evidence of validity was derived by observing relationships among the motivational variables and theoretically independent variables; we expected no significant correlations with demographic indices, measures of positive and negative symptoms, cognitive and functional status, or social desirability.

## Method

### Pilot Testing

We administered each measure to 21 persons attending a day treatment program at a psychiatric clinic, in order to determine whether persons with a SPMI could respond meaningfully to the self-report questionnaires. All pilot participants had lifetime diagnoses of substance use disorder, according to chart review and consultation with clinic staff; the sample is fully described elsewhere (Carey, Purnine, Maisto, Carey, & Barnes, 1999b). Measures were administered in both written and oral formats. Participants discussed their impressions of each measure after they completed it. We determined that it was necessary to administer all instruments orally, in interview format, in order to maximize participants' level of attention, optimize the pace of administration, and clarify items for participants. These discussions led to modification of some instruments in ways that are described later. Final versions of each measure were analyzed for readability, and Flesch-Kincaid grade levels of the three instruments and the social desirability scale ranged from 6.1 to 7.5.

### Main Study

**Participants**—Participants were identified by a screening procedure (described later), and 71% (236/333) of the eligible patients who were approached consented to participate in the study. The 84 persons who had problematic use of a substance within the last 12 months and who completed all study assessments comprise this study sample. Problematic use of a substance was defined as the presence of any symptom of abuse or dependence. This subset was selected to increase the likelihood that substance use would be recent and that participants would find the notion of change to be relevant to them. Men made up 65% of his group and ages ranged from 18 to 53 years ($\underline{M} = 37$). Median income was $525 per month and the mean and median education level was 12 years. The majority of participants were Caucasian ($\underline{n} = 61$, 73%); 18 participants were African-American (21%) and five people identified with other ethnic/racial groups. Thirty-six persons reported no partners (43%) or having been separated/ divorced (39%), and the remainder were living with a married or unmarried partner (18%). The study sample differed from the rest of the full sample on only one demographic variable;

those persons with recent substance use disorder were younger than persons who were problem-free for at least 12 months ($\underline{M}$ = 37 versus $\underline{M}$ = 43 years of age; $\underline{t}$(137) = 3.61, $\underline{p}$ = .004).

Problematic substance use occurred in the last month for 45 persons (54%); all except two of these individuals met criteria for a "current" substance use disorder. Alcohol was the primary problem substance for the majority of participants (60%). This was followed by cannabis (24%) and cocaine (13%). Two participants primarily abused opioids and one person abused sedatives. A full 80% of the participants met criteria for more than one substance use disorder. Principal Axis I diagnoses were Schizophrenia-spectrum disorders (55%), Major Depression (32%), or Bipolar Disorder (13%).

## Readiness-to-Change Instruments

**Stages of Change Readiness and Treatment Eagerness Scale (SOCRATES) (Miller & Tonigan, 1996):** An adaptation of the URICA, the SOCRATES is a 19-item self-report measure developed to evaluate readiness-to-change among drinkers or drug users. The SOCRATES was originally developed with five sets of items reflecting stages of change (Prochaska, DiClemente, & Norcross, 1992), with a specific focus on drinking or drug use (e.g., "I am uncertain about whether I drink too much"). For each item, respondents use a 5-point Likert scale that ranges from "strongly disagree" to "strongly agree." The factor structure of the SOCRATES was established with a sample of more than 1600 outpatients; factor analysis has identified three subscales: Recognition, Taking Steps, and Ambivalence. These scales showed moderate reliability (alpha coefficients ranged from .60 to .85). In a second sample ($\underline{N}$ = 82), Miller and Tonigan (1996) reported high internal consistencies (alphas = .87 to .96), and good temporal stability (two-day intraclass correlations ranged from .82 to .94). The three-factor structure has been corroborated by independent research (Isenhart, 1994) and convergent evidence has supported the validity of the Recognition scale (Dermen, Koutsky, Connors, & Czarnecki, 1997; Miller & Tonigan, 1996). Miller and Tonigan (1996) reported that the Recognition and Taking Steps scales were moderately correlated ($\underline{r}$=.33) but others have reported larger (e.g., .53) correlations between the two (Dermen et al., 1997).

**Decisional Balance Scale (DBS) (King & DiClemente, 1993):** The DBS is a 20-item assessment of the pros and cons of continued drinking. Responses are normally made on a 5-point Likert scale ranging from "not important" to "extremely important" in making a decision about drinking. Exploratory factor analysis has supported a two-factor solution (pros and cons), and the two scales correlate with a related measure, providing convergent support of the measure's validity. Because pilot-testing indicated that adults with a SPMI found the response anchors confusing, we used a 5-point response scale ranging from "strongly agree" to "strongly disagree."

**Alcohol and Drug Consequences Questionnaire (ADCQ) (Cunningham, Sobell, Gavin, Sobell, & Breslin, 1997):** The 29-item ADCQ assesses the pros and cons of <u>quitting</u> substance use. Responses are made on a 6-point Likert scale. The lowest response option is 0 ("probably will not happen to me"); other options reflect that the consequence "probably will happen to me and it is "not important" (1) to "extremely important" (5). Because the response format proved confusing to pilot participants, we administered the ADCQ orally and asked two questions: (a) Was the specified consequence likely to occur (yes or no); if not, we entered a "0" and proceeded to the next item; (b) If yes, we then asked how important that consequence was to them in their decision to "cut down or stop using" their primary substance, using the 1-5 response options.

The two subscales, costs of quitting and benefits of quitting, are supported by factor analysis and are internally consistent (alphas = .90 and .92, respectively) (Cunningham et al., 1997). In

a sample of persons seeking alcohol treatment, validity of the measure was supported by convergent evidence, as each scale was related to the number of self-generated costs (or benefits) of quitting, and by predictive evidence, as each scale was related to post-treatment drinking (Cunningham et al., 1997).

### Diagnostic Instruments

**Mini-Mental State Exam (MMSE) (Folstein, Folstein, & McHugh, 1975):** This brief screen for gross cognitive dysfunction assesses orientation, memory, attention, naming, verbal comprehension, writing and copying abilities. Test-retest stability (up to 28 days) among psychiatric patients ranges from .82 to .98. Correlations between MMSE scores with Wechsler Adult Intelligence Scale scores ($r$ =.78 with Verbal IQ, and $r$ =.66 with Performance IQ; Folstein et al., 1975) provide evidence of validity. Patients scoring 23 or less (the standard cut-off score for dementia) were generally excluded from the study. This cut-off was used as a guideline and was subordinate to the assessor's clinical judgment.

**Structured Clinical Interview for the DSM-IV (SCID) (First, Spitzer, Gibbon, & Williams, 1995):** To determine DSM-IV diagnosis, we used the SCID-Patient Version (SCID-I/P), which is suited to the task of making differential diagnoses of psychotic disorders. The sections on mood, psychotic, and substance-related disorders were used to determine if participants met diagnostic eligibility criteria. Consistent with recommended SCID procedure, collateral information from participants' psychiatric charts was consulted and systematically recorded to assist in making the most accurate diagnosis.

One modification that we made to the SCID should be noted. For each drug, we created an item modeled on the following SCID alcohol item: "number of months prior to interview when last had some problems with alcohol." To establish reliability of diagnosis, a subsample of videotaped interviews ($n$=28) was examined by a second rater. Primary diagnosis was assessed reliably (kappa =.88), as was the presence of a substance use disorder within the last 12 months (K-R 20 = .86).

**Positive and Negative Symptom Scale (PANSS) (Kay, Fiszbein, & Opler, 1987):** The PANSS is a 30-item clinical rating scale that measures positive symptoms (e.g., hallucinations, delusions), negative symptoms (e.g., flat affect, avolition), and general psychopathology. The psychometric properties of the PANSS have been studied extensively among persons with schizophrenia, with strong support for the internal consistency (Kay, Fiszbein, Lindenmayer, & Opler, 1986; Kay, Opler, & Lindenmayer, 1989), temporal stability (Kay et al., 1987), and interrater reliability for the positive and negative scales. Criterion-related, construct, and predictive evidence for the validity of the PANSS have been provided (Kay et al., 1989).

PANSS ratings were based on the SCID interview, behavioral observation, chart information, and the MMSE. Supplemental items were added to the SCID interview to provide necessary supplemental information for making the ratings (Purnine, Carey, Maisto, & Carey, in press). The internal consistency of the positive and negative scales in this sample was adequate (alpha = .75 & .72, respectively).

**Social Desirability Scale (SDS) (Crowne & Marlowe, 1960):** This self-report instrument measures a person's tendency to present oneself in a socially desirable manner. We used a 13-item version of the SDS (Reynolds, 1982), which is highly correlated with the original 33-item version ($r$ = .93), is internally consistent (alpha =.76), and has adequate test-retest reliability ($r$ = .88).

## Procedures

**Screening and recruitment:** Participants were identified through a screening procedure implemented at two psychiatric treatment settings. All new admissions, as well as all patients attending outpatient services completed a brief screening battery that included the Alcohol Use Disorders Identification Test (AUDIT: Bohn, Babor, & Kranzler, 1995) and the 10-item Drug Abuse Screening Test (DAST: Skinner, 1982); details of this institution-wide screening have been described previously (Carey et al., 1999c).

Eligibility criteria included: (1) age between 18 and 65, (2) a score of at least 8 on the AUDIT or at least a 3 on the DAST, and (3) probable schizophrenia or major mood disorder. Eligible outpatients received a brief description of the study and were invited to participate. Those who agreed to participate signed a consent form and completed a brief demographic questionnaire. Exclusion criteria included: (1) obvious cognitive limitations or (2) psychiatric instability, based either on reports from therapists and clinical judgment of the assessor.

Participation in this study involved three sessions: diagnostic assessment, test, and retest. All sessions took place in private offices in the clinic itself or in an adjacent building. We administered a breathalyzer at the beginning of all sessions; meetings were rescheduled for a later date if blood alcohol level was .02 or higher. Diagnostic sessions were conducted by doctoral-level or masters-level clinical psychologists. The other assessments were conducted by trained research assistants.

**Diagnostic session:** This session included the MMSE, SCID, PANSS, and SDS; it lasted approximately 1.5 hours. Participants who had a major Axis I thought disorder or mood disorder, as well as a lifetime or current (last 30 days) diagnosis of substance abuse or dependence, were invited to further sessions. Those with excessive cognitive disorganization, based on MMSE score, behavior during the SCID, and clinical judgment, were excluded ($\underline{n} = 14$).

We identified a "primary substance" in order to provide a specific focus for completing the readiness-to-change measures. Primary substance was determined by a decision rule based on data obtained from the SCID diagnostic interview. Specifically, we used the following hierarchy as a heuristic to designate the primary substance problem: (1) a substance for which dependence criteria were met was always chosen over one for which only abuse criteria were met, and (2) when more than one drug met criteria, the current or more recent, over less recent substance was selected. In the case of ties, we considered the number and severity of specific symptoms. Note that substance use disorders involving nicotine and/or caffeine were excluded from consideration as primary substance. Participants were paid $10 for completing the diagnostic session.

**Test and retest sessions:** The test session included the SOCRATES, DBS, and ADCQ. Because these were administered orally, we tailored items to the primary substance. If the substance was cocaine, for example, the item, "I have serious problems with drugs/alcohol," was read by the administrator as follows: "I have serious problems with cocaine." Response options were presented to participants on a printed card, and reviewed at the start of each instrument and as often as needed thereafter to ensure that they were understood. The retest session involved repeated administration of the three readiness-to-change measures. The retest session typically occurred (i.e., 93% of the time) within two to seven days after the initial session ($\underline{M} = 5.31$ days, $\underline{SD} = 5.48$). Participants were paid $20 upon completion of the retest session.

# Results

## Reliability

Each of the seven scales was evaluated for internal consistency by calculating Cronbach's alpha. As shown in Table 1, 6 of the 7 scales were internally consistent; only the Ambivalence scale of the SOCRATES produced a marginal coefficient alpha. All of the alphas for the DBS and ADCQ scales were .84 or higher, indicating excellent internal consistency.

Temporal stability was also assessed for all seven of the scales. Table 1 also illustrates that all of the intraclass correlation coefficients (ICCs) ranged from .73 to .90. Thus, over the short interval assessed ($\underline{M}$ = 5 days), participants gave consistent responses to all of the measures.

## Influence of Clinical Status on Reliability

Next, we divided the sample on the basis of four clinical variables to investigate their relationship to the reliability of responses. First, we classified participants according to primary psychiatric diagnosis, and we recalculated the internal consistency and temporal stability indices separately for the 38 persons with schizophrenia-spectrum disorders and the 46 persons with mood disorders. Second, we grouped participants according to cognitive status; low represents participants with MMSE scores at or below the sample median (range 19-27), and high represents those who scored higher than the median on the MMSE (range 28-30). Third, we grouped participants according to severity of positive symptoms; high severity represents those who scored above the median (range 13-34) and low severity represents scores at or below the median (range 7-12) on the PANSS positive symptom scale. Last, we grouped participants according to severity of negative symptoms; high severity represents participants who scored above the sample median (range 17-28) and low severity represents those scoring at or below the sample median (range 7-16) on the PANSS negative symptom scale.

Table 2 presents reliability data for each of these nonindependent subsets. Careful study of the alphas and ICCs indicates no systematic pattern of lower reliabilities for any of the high severity groups, nor any systematic trends when participants with schizophrenia were compared to those with mood disorders. With the exception of the Ambivalence scale of the SOCRATES, all reliability indices remained acceptable (.63 or above) even when the sample was split into smaller groups defined by the identified clinical variables.

## Validity Evidence

Table 3 contains intercorrelations among the 7 readiness-to-change variables. In general a consistent pattern of relationships emerged among these variables. As expected based on previous research, a positive correlation was expected between the Taking Steps and Recognition scales of the SOCRATES. However, the .60 correlation found in this study was greater than the .33 reported by the scales' developers (Miller & Tonigan, 1996), but consistent with the .51 correlation reported by Dermen and colleagues (1997). We also observed a substantial correlation between Ambivalence and Recognition ($\underline{r}$ =.49), although these two scales were not significantly associated in the original report (Miller & Tonigan, 1996).

Consistent with our expectations, we found moderate negative correlations between pros and cons of using ($\underline{r}$ = -.22), and costs and benefits of quitting ($\underline{r}$ = -.23). We also expected and found correlations between conceptually related variables, such as the pros of using and the costs of quitting ($\underline{r}$ = .59), and between cons of using and benefits of quitting ($\underline{r}$ = .61). These strong relationships indicated that participants responded consistently across instruments, and that the more that one perceived positive benefits in using substances, the more costly it was perceived to quit or cut down. Conversely, the more one sees drawbacks to using substances, the more attractive quitting is perceived.

In addition, the expected pattern emerged between the Taking Steps scale of the SOCRATES and pros of using ($\underline{r}$ = -.45), cons of using ($\underline{r}$ = .47), costs of quitting ($\underline{r}$ = -.28), and benefits of quitting ($\underline{r}$ = .64). Thus, the more one acknowledged taking action to reduce substance use behavior, the less attractive using will be and the more attractive quitting/cutting down will be. A similar pattern emerged with the Recognition scale; those showing problem recognition also endorse strongly the cons of using ($\underline{r}$ = .69) and the benefits of quitting ($\underline{r}$ = .70).

Table 4 presents correlations for the seven readiness-to-change variables (columns) with demographic and clinical variables and social desirability (rows). There was no a priori reason to believe that indices of readiness-to-change should be related to age, education, income, gender or race, and no significant relationship emerged among this set of variables. Neither did we expect to find associations between readiness-to-change and clinical symptoms. We found that the Taking Steps scale was negatively associated with PANSS positive scores ($\underline{r}$ = -.27), and PANSS total symptom score ($\underline{r}$ = -.22). Furthermore, the GAF rating correlated negatively with the costs of quitting ($\underline{r}$ = -.22). Finally, the only readiness-to-change variable to be significantly associated with social desirability was Taking Steps ($\underline{r}$ = .21).

## Discussion

The findings of this study lend support to efforts to quantify readiness-to-change substance misuse among persons with Axis I major mental disorders. We selected three instruments that had been shown to be psychometrically sound in samples of treatment-seeking substance users, and evaluated their psychometric properties with a sample of outpatients dually diagnosed with SPMI and substance use disorders. All of the scale scores derived from the SOCRATES, the DBS, and the ADCQ proved to be reliable and stable in this dually diagnosed sample; when the entire sample was included in the reliability analyses, coefficients were in the good (.60-.74) to excellent (.75 and above) range according to suggested guidelines (Cicchetti, 1994). The reliability estimates obtained in this study compare favorably to those found with other populations (Cunningham et al., 1997; Miller & Tonigan, 1996). The only scale that demonstrated marginal internal consistency was the Ambivalence scale of the SOCRATES, specifically in the most impaired subsets of the sample (i.e., participants with schizophrenia, with low cognitive status, high degree of positive symptoms and high negative symptoms). In light of the inconsistent performance of this scale in this and other samples (Dermen et al., 1997; Miller & Tonigan, 1996) we caution that responses to the Ambivalence scale appear to be stable over time but not internally consistent.

Reanalysis of the reliability data by groups defined by selected clinical variables yielded reliability estimates that differed little from those obtained from the whole sample. No noticeable decrement in consistency of responding emerged when persons with schizophrenia were separated from those with mood disorders; neither did cognitive status, or positive or negative symptoms impact the results. In this regard, the clinical scores obtained in our sample reflected a wide range of psychiatric symptomatology; in fact, the positive and negative symptom scores ranged from absent to levels higher than mean ratings obtained in inpatient samples, with comparable variability (Kay & Murrill, 1990; Peralta & Cuesta, 1994). Thus, within the ranges represented in this sample, psychiatric symptomatology should not impair participants' abilities to give consistent responses to these measures.

The multi-trait approach to validation used in this study yielded support for the validity of the readiness-to-change measures. Within the transtheoretical model, the constructs of recognition and taking steps are related to decisional balance (Prochaska et al., 1994). Furthermore, qualitative data obtained from psychiatric outpatients suggest that decisional balance for continued substance use is related but not identical to decisional balance for changing substance use (Carey et al., in press). However, this is the first study that has evaluated the construct

validity of multiple self-report measures of readiness-to-change. The consistent and interpretable pattern of results presented in Tables 3 and 4 provides evidence that our participants, despite the impairments associated with a SPMI, responded consistently to the different measures. The cross-sectional nature of these data precludes inferences about temporal relations among these variables (i.e., the strong concurrent correlations observed among theoretically-related variables do not address the extent to which manipulating one might cause changes in another). Authors describing motivation enhancement interventions for this population have suggested that increasing a person's awareness of the cons of using, or the benefits of quitting, may result in greater recognition of substance use problems and likelihood of taking steps (Carey, 1996; Mercer, Mueser, & Drake, 1998; Ziedonis & Trudeau, 1997), however, longitudinal or experimental evidence for this relationship is needed.

The discriminant evidence for validity argues against the possibility that a simple responding bias may account for the convergent evidence for validity. None of the indicators of readiness-to-change were associated with demographic variables. The modest yet significant negative correlations between the Taking Steps scale of the SOCRATES and PANSS total and positive symptoms suggest that the more disorganized and symptomatic participants were less likely to report following through with substance-related treatment. Furthermore, the positive correlation between Taking Steps and social desirability indicates that this scale may be subject to social desirability response bias. Although this was not a strong association, it is worth considering the role of impression management on self-reported treatment involvement in future studies of this type.

One limitation of these data lies in the exclusive reliance on self-report. Although participants are responding in reliable and theoretically-consistent fashion, it is unclear the extent to which their verbal behavior generalizes to other types of behavior. The degree to which behavior observed under controlled conditions generalizes to other situations encountered by persons with a SPMI has long been a source of concern (Bellack & Mueser, 1992; Liberman, DeRisi, & Mueser, 1989). We are in the process of evaluating the relationships between self-report measures of readiness-to-change and other behavioral indices (e.g., substance use and treatment attendance), to provide additional evidence of the utility of this construct in the treatment of comorbid psychiatric and substance use disorders. A second limitation is that our interview administration of the instruments differs from the more standard self-administered approach; thus, we cannot judge whether our findings would generalize to other modes of administration. In addition, we administered all of the readiness-to-change measures after conducting a diagnostic interview; the interview (which included a substance use disorder module) may have influenced responses to the self-report measures. To minimize this possibility, however, study protocol dictated that the interview and the subsequent test session be scheduled on different days and conducted by different people.

The findings of this study demonstrate that use of self-report measures of readiness-to-change can be justified when developing and evaluating treatments for persons dually diagnosed with a SPMI and a substance use disorder. The availability of psychometrically-sound instruments is useful for identifying patients who are likely to benefit from motivation-enhancing interventions and for treatment planning. To the extent that increasing readiness-to-change itself becomes a treatment goal (Miller, Zweben, DiClemente, & Rychtarik, 1992), then such measures may also be included in outcome assessments.

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**Table 1**

Reliability of Readiness-to-Change Measures

| Measures | Alpha Coefficients | Test-retest Intraclass Correlations |
|---|---|---|
| SOCRATES | | |
| Taking Steps | .90 | .82 |
| Recognition | .91 | .90 |
| Ambivalence | .60 | .79 |
| DBS | | |
| Pros of using | .84 | .84 |
| Cons of using | .86 | .84 |
| ADCQ | | |
| Costs of quitting | .85 | .73 |
| Benefits of quitting | .93 | .89 |

Notes. N=84. All participants had lifetime substance use disorders and reported evidence of problematic substance use in the last 12 months. SOCRATES = Stages of Change Readiness and Treatment Eagerness Scale. DBS = Decisional Balance Scale. ADCQ = Alcohol and Drug Consequences Questionnaire.

**Table 2**

Reliability of Readiness-to-Change Measures, Differentiated by Diagnosis, Cognitive Status, and Symptom Severity

| Measures | Schizophrenia vs. Mood Disorders | | | | Cognitive Status | | | |
|---|---|---|---|---|---|---|---|---|
| | Schizophrenia (n=38) | | Mood Disorders (n=46) | | Low (MMSE ≤27; n=40) | | High (MMSE >27; n=44) | |
| | Alpha | Retest | Alpha | Retest | Alpha | Retest | Alpha | Retest |
| Taking Steps | .90 | .84 | .90 | .80 | .90 | .75 | .90 | .89 |
| Recognition | .92 | .88 | .90 | .93 | .88 | .91 | .93 | .90 |
| Ambivalence | .54 | .80 | .65 | .78 | .54 | .76 | .65 | .82 |
| Pros of using | .87 | .88 | .82 | .78 | .89 | .87 | .78 | .80 |
| Cons of using | .83 | .79 | .89 | .87 | .89 | .84 | .83 | .83 |
| Costs of quitting | .84 | .74 | .86 | .70 | .86 | .77 | .83 | .69 |
| Benefits of quitting | .92 | .84 | .95 | .94 | .94 | .93 | .93 | .86 |

| | PANSS Positive Symptoms | | | |
|---|---|---|---|---|
| | High Severity (score >12; n=40) | | Low Severity (score ≤12; n=43) | |
| | Alpha | Retest | Alpha | Retest |
| Taking Steps | .89 | .77 | .84 | .90 |
| Recognition | .89 | .87 | .93 | .92 |
| Ambivalence | .55 | .70 | .84 | .66 |
| Pros of using | .86 | .87 | .79 | .82 |
| Cons of using | .83 | .77 | .87 | .88 |
| Costs of quitting | .84 | .74 | .63 | .83 |
| Benefits of quitting | .92 | .83 | .94 | .95 |

| | PANSS Negative Symptoms | | | |
|---|---|---|---|---|
| | High Severity (score >16; n=41) | | Low Severity (score ≤16; n=42) | |
| | Alpha | Retest | Alpha | Retest |
| Taking Steps | .92 | .84 | .80 | .89 |
| Recognition | .88 | .86 | .93 | .93 |
| Ambivalence | .57 | .81 | .79 | .64 |
| Pros of using | .83 | .76 | .89 | .86 |
| Cons of using | .87 | .84 | .83 | .86 |
| Costs of quitting | .81 | .63 | .79 | .88 |
| Benefits of quitting | .92 | .80 | .96 | .95 |

Notes. MMSE = Mini-Mental State Exam. PANSS = Positive and Negative Symptom Scale.

**Table 3**

Intercorrelations Among Readiness-to-Change Measures

| Measure | Taking Steps | Recognition | Ambivalence | Pros of using | Cons of using | Costs of quitting |
|---|---|---|---|---|---|---|
| Taking Steps | | | | | | |
| Recognition | .60*** | | | | | |
| Ambivalence | .15 | .49*** | | | | |
| Pros of using | -.45*** | -.23* | .13 | | | |
| Cons of using | .47*** | .69*** | .30** | -.22* | | |
| Costs of quitting | -.28** | .05 | .14 | .59*** | -.01 | |
| Benefits of quitting | .64*** | .70*** | .30** | -.39** | .61*** | -.23* |

*
p ≤ .05

**
p ≤ .01

***
p ≤ .0001

**Table 4**

Discriminant Evidence for the Validity of Readiness-to-Change Measures

| | Taking Steps | Recognition | Ambivalence | Pros of using | Cons of using | Costs of quitting | Benefits of quitting |
|---|---|---|---|---|---|---|---|
| Demographic and Psychiatric Variables | | | | | | | |
| Gender (t, 82 df) | .21 | 1.56 | .80 | .57 | -.65 | 1.04 | -1.49 |
| Race (t, 82 df) | -1.10 | -.24 | .77 | 1.03 | -.60 | 1.42 | -1.34 |
| Age | -.00 | .09 | -.01 | -.11 | .03 | .15 | .03 |
| Education | -.10 | -.11 | -.13 | .07 | -.16 | .05 | -.10 |
| Income | -.15 | -.15 | -.07 | -.04 | -.21 | .21 | -.13 |
| PANSS Positive score | -.27** | -.07 | -.04 | .09 | -.15 | .16 | -.06 |
| PANSS Negative score | -.03 | .11 | .11 | .03 | .04 | .11 | -.10 |
| PANSS Total Score | -.22* | -.02 | .04 | .08 | -.10 | .17 | -.15 |
| GAF | .17 | -.02 | .05 | -.15 | .01 | -.22* | .15 |
| MMSE | -.08 | -.07 | .04 | .18 | -.07 | .06 | -.05 |
| Social Desirability | .21* | -.02 | -.04 | -.17 | -.21 | -.20 | -.00 |

Note: All figures are Pearson product-moment correlations, except where otherwise indicated. PANSS = Positive and Negative Symptom Scale. GAF = Global Assessment of Functioning. MMSE = Mini-Mental State Exam.

*
$p \leq .05$.

**
$p \leq .01$.