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## Beyond Motivation: Initial validation of the Commitment to Sobriety Scale

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### Abstract

From an addiction treatment and recovery standpoint maladaptive motivational hierarchies lie at the core of the challenge in mobilizing salutary behavior change. Motivation has been conceptualized as dynamic, interactive and modifiable, as well as multidimensional. Measures of recovery motivation have been developed and validated, but are generally only modest and variable predictors of future behavior. A related, but potentially more potent, construct, is that of *commitment* to sobriety as it denotes a clearer re-ranking of motivational hierarchies such that the recovery task is now given a top priority potentially less susceptible to the risks associated with undulating future circumstance. This study investigated the psychometric properties of a novel commitment to sobriety scale (CSS). Results revealed a coherent, psychometrically valid, and reliable tool that outperformed an existing commitment to abstinence scale (ATAQ; Morgenstern et al, 1996) and a gold standard measure of motivation (SOCRATES; Miller and Tonigan, 1996). This study highlights commitment to sobriety as an important addiction construct. Researchers and theoreticians may find the CSS useful in helping to explain how individuals achieve recovery, and practitioners may find clinical utility in the CSS in helping identify patients in need of more intensive or alternative intervention.

### Keywords

motivation; addiction; substance abuse treatment; commitment; sobriety; young adults

## 1. Introduction

The construct of motivation is considered to be a fundamental and critical factor in predicting future human behavioral engagement and performance. Myriad general psychological theories have been proposed to describe and explain motivation ranging from drive reduction theory (Hull, 1935), to incentive and arousal theories (Ostafin et al, 2010), to humanistic theories (Maslow, 1967). Because it is considered a causal factor in taking action, motivation also plays a central role in the substance use disorder (SUD) treatment and recovery field. In fact, in many individuals' estimation, maladaptive motivational hierarchies lie at the heart of addiction and the associated challenges with salutary behavior change (W. Miller, Rollnick, & Moyers, 1998). Resolving ambivalence about change, for

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instance, is a central feature of motivational interviewing - one of the most popular evidence-based treatments in the addiction field (Allsop, 2007; Finney and Monahan, 1996; Miller and Rollnick, 2013; Smedslund et al, 2011) and motivation is the basis for the heuristic stages of change model (Prochaska & DiClemente, 1983).

Research confirms that motivation to change alcohol or other drug use at a given point in time is a predictor of future substance use albeit a modest one (Collins et al, 2012; Field et al, 2009), as it is vulnerable to shifting environmental cues, circumstances, and contingencies. As such, motivation is considered to be dynamic and fluctuating, interactive and modifiable, as well as multidimensional (Miller and Rollnick 2013, Center for Substance Abuse Treatment, 1999). From an SUD treatment and recovery perspective, motivation contains elements of the importance of change as well as readiness to embark upon a course of action (Rollnick, Mason, & Butler, 1999). A further related, but potentially more potent, element of the multi-dimensional construct of motivation to change is the construct of “commitment to change”.

In contrast to being “motivated to change”, being “committed to change” implies the presence of a much stronger desire that is more compelling and forceful, and that may be less susceptible to the undulating future circumstances and contingencies that so often weaken resolve and make motivation fluctuating and dynamic. For example, “making a commitment” to perform a future behavior, denotes a re-ranking of motivational hierarchies such that the task is now given a top priority at the designated time, and, consequently, will be performed irrespective of how one feels about it at the time of execution or in the intervening time period. In this way, it may diminish the potential influence of undulating future circumstance and contingencies and strengthen a non-contingent, rule-governed, resolve to complete the behavior (e.g., “I’m going to do it no matter what happens, no matter how I feel”). This construct is now being investigated and recognized as an important predictor and mediator of common therapeutic interventions for SUD, such as motivational interviewing (Amrhein, Miller, Yahne, Palmer, & Fulcher, 2003).

While several measures exist in the SUD field that attempt to tap into the motivational construct (Maisto, Chung, Cornelius, & Martin, 2003; W.R. Miller & J.S. Tonigan, 1996; Pantalon, Nich, Frankforter, & Carroll, 2002; Tonigan, Miller, & Connors, 2000), we are aware of only two other measurement tools that specifically evaluate abstinence commitment: the Commitment to Lifelong Abstinence subscale of the Addiction Treatment Attitudes Questionnaire ((ATAQ; Morgenstern, Frey, McCrady, Labouvie, & Neighbors, 1996; Morgenstern et al, 2008) and a single-item, Thoughts About Abstinence Scale used in smoking cessation (Hall, Havassy, & Wasserman, 1991). Given the conceptual importance of this construct in changing addictive behavior, we wanted to see if we could improve upon existing measures. To this end, the current study developed and tested a brief, standalone measure of commitment to sobriety (the Commitment to Sobriety Scale [CSS]) intended for use in SUD research and also to have clinical utility. Given the implied greater level of prioritization and resolve to make and sustain behavioral change inherent in the commitment construct, we anticipated that, compared to a validated, widely used, measure of motivation (i.e., the SOCRATES (Miller & Tonigan, 1996)) and a Commitment to Lifelong Abstinence subscale of a measure of treatment attitudes (i.e., the ATAQ (Morgenstern et al., 1996), our commitment to sobriety scale would be a stronger predictor of post treatment substance use and, if psychometrically validated in other ways (i.e., possesses a coherent factor structure, adequate internal consistency, and has convergent and discriminant validity), may consequently play a useful role in clinical settings as well as in advancing theories that attempt to explain how and why individuals change addictive behavior.

## 2. Methods

### 2.1 Study population and protocol

The study population consisted of 302 young adult patients (18-25 years old) undergoing residential treatment and enrolled in a naturalistic study of treatment process and outcome. At admission, participants were 20.4 years old on average ( $SD = 1.6$ ). The majority were Caucasian (95.0%), male (73.8%) and single (100%). The most commonly reported primary substance was alcohol (26.8%) and marijuana (26.8%), followed by opiates (21.5%), and stimulants (19.5%).

Participants in this private residential treatment sample were more likely to be Caucasian than young adults (18-24 years old) in public sector residential treatment (76%) (Substance Abuse and Mental Health Services Administration, 2009), or adults (18+ years old) in the broader private treatment sector (71%) (Roman & Johnson, 2004). They were, however, comparable in terms of gender, marital status, and employment status, suggesting the sample may be broadly comparable to young adults treated for SUDs across the US.

A total of 607 young adults were admitted to treatment during the recruitment period (October 2006 to March 2008). Participants were enrolled in the study shortly after admission. All of those aged 21-24 years old were approached for study enrollment, as well as every second individual aged 18-20. This was done to ensure sufficient representation of the older age group, given the predominance of those aged 18-20 at the treatment center. A small number of potential participants left treatment before recruitment could take place ( $n = 6$ ) or were not approached by staff for recruitment ( $n = 14$ ). Of those approached ( $n = 384$ ), 64 declined or withdrew participation. Reasons for non-participation included not wanting to participate in the follow-up interviews (44%), not being interested in the study (31%), wanting to focus on treatment (14%), and legal issues (2%). Following enrollment, an additional 17 participants withdrew prior to the baseline assessment and the consent for one participant was misplaced. The final sample of 302 represents 78.6% of those approached for participation.

Research staff conducted assessments at baseline, end of treatment, and 3-, 6-, and 12-months post-discharge. Each assessment included an interview portion, completed either in person or by telephone, and self-administered surveys, which were returned by mail. Participants were reimbursed \$30 for the baseline and end of treatment assessments, and \$30, \$40, and \$50 for the post-treatment assessments at 3, 6 and 12 months, respectively. Study retention rates were 85.7% ( $n=257$ ) at end of treatment, 81.8% ( $n = 248$ ) at 3-month follow-up, 74.3% ( $n = 225$ ) at 6-month follow-up, and 71.3% ( $n = 216$ ) at 12-month follow-up. At each time point, those who did not complete the assessment were compared to those who were retained in terms of gender, age, race, education, employment status, and baseline psychological symptoms (BSI), dependence severity (LDQ) and percent days of abstinent (from all substances except nicotine) in the 90 days prior to treatment ( $\alpha = .05$ ). Study retention during the follow-up period was associated significantly only with having a post-secondary education and being Caucasian ( $p < .05$ ). These variables were controlled for in prospective analyses.

The study was conducted in accordance with the Institutional Review Board at Schulmann Associates IRB, an independent review board, and all participants signed informed consent documents.

### 2.2 Measures

**2.2.1 The Commitment to Sobriety Scale (CSS)**—The CSS is a brief 5-item measure, completed via interview to assess level of client commitment to alcohol and drug use

cessation and continued abstinence. Items were selected using a rational keying approach based on theories of motivational change and self-regulation and in consultation with clinical staff at two addiction treatment programs. It was decided relatively early on that the narrow nature of this construct did not require a large pool of items. In fact a small pool of items were generated which was reduced on further discussion to only 7. This was later reduced to the 5 items used in the administered CSS as the remaining two items were not deemed related to the commitment to sobriety construct. The items rate the level of agreement with statements concerning abstinence (i.e., “Staying sober is the most important thing in my life”, “I am totally committed to staying off alcohol/drugs”, “I will do whatever it takes to recovery from my addiction”, “I never want to return to alcohol/drug use again”, “I have had enough alcohol and drugs”). Each item is rated on a 6-point Likert scale from *strongly disagree* (1) to *strongly agree* (6). The CSS was administered at baseline, end of treatment, 3-, 6- and 12-months post-discharge.

## 2.2.2 Convergent measures

### 2.2.2.1 Stages of Change Readiness and Treatment Eagerness Scale

**(SOCRATES)**—The measure selected to assess convergent validity was the SOCRATES (versions 8A/AD) (W. R. Miller & J. S. Tonigan, 1996), which is a self-report assessment of motivation to change substance use behavior, with 19 items repeated separately for alcohol and other drugs. Factor analyses reveal three subscales representing “problem recognition” (7 items), “ambivalence” (4 items), and “taking steps” (8 items). The items are rated on a 5-point Likert scale based on agreement with each statement, from *strongly disagree* (1) to *strongly agree* (5). Responses are summed to provide total scores for each subscale (potential ranges = 7-35, 4-20, and 8-40). The subscales have demonstrated acceptable to high internal consistency ( $\alpha$ 's = .60-.85) and high test-retest reliability (ICC's = .82-.94) among adults with alcohol-related problems and disorders (W. R. Miller & J. S. Tonigan, 1996), with additional evidence of concurrent and predictive validity among adolescents (Maisto et al., 2003). The SOCRATES was administered to participants at baseline and end of treatment.

### 2.2.2.2 Addiction Treatment Attitudes Questionnaire (ATAQ)

—The ATAQ (Morgenstern et al., 1996) is a self-report measure assessing attitudes toward treatment and recovery. The 49 items address processes believed to be targeted by traditional or disease-based therapeutic models, producing nine subscales, one of which is commitment to lifelong abstinence (5 items;  $\alpha$  = .86; i.e. “I can have a drink/drug once in a while, as long as I limit it to special occasions”, “I should never have another drink/drug”, “I can never drink/use drugs again, not even once”, “Once I'm not under so much stress, I'll be able to drink or use drugs in moderation”, “I believe I should never use alcohol or any mood altering chemicals again”). Respondents rate their agreement with each statement, from 1 (strongly disagree) to 5 (strongly agree). Summed scores are taken, with higher scores indicating more positive attitudes toward treatment. (Morgenstern et al., 1996).

### 2.2.3 Discriminant measure: Religious Background Behavior Questionnaire

**(RBBQ)**—The RBBQ (Connors, Tonigan, & Miller, 1996) is a self-report questionnaire that measures patients' religious/spiritual beliefs and related practices for lifetime and past year timeframes. This construct has been shown to be important in terms of general adaptation and coping among adolescents (Kerestes, Youniss, & Metz, 2004) and has theoretical pertinence to 12-step meeting attendance and involvement (Winzelberg & Humphreys, 1999). This measure has excellent test-retest reliability ( $r$  = .97) and good internal consistency ( $\alpha$  = .86) in an adult sample (Connors et al., 1996). The RBBQ was administered to participants at baseline. Given the different constructs measured by the CSS

and the RBBQ, the RBBQ was not expected to correlate significantly with the CSS and was thus employed as a measure of discriminant validity.

**2.2.4 Criterion measures: Form-90**—The Form-90 (W. R. Miller & Del Boca, 1994; Project MATCH Research Group, 1993) is an interview-based measure capturing substance use among other clinically-relevant variables. The recall period for the baseline interviews was 90 days. Modifications were made to subsequent assessments to capture the entire time period elapsed since the previous interview (e.g., 90 days for the 6-month follow-up, but 180 days for the 12-month follow-up). However, a sub-sample ( $n = 35$ ) completed an interview subsequent to missing a prior one and, thus, reported over a longer than average period of time assessment window (e.g., they missed the 6 month assessment and reported on activities between 3-month and 12-month follow-up interviews). The primary outcome measure derived from this instrument was percentage of days abstinent (PDA) from all substances (except nicotine). The Form-90 has been tested with adult and adolescent samples and has demonstrated test-retest reliability and validity (Slesnick & Tonigan, 2004; Tonigan, Miller, & Brown, 1997).

### 2.3 Analysis plan

1. We first examined the CSS measures of central tendency and dispersion at each time point followed by descriptive stratification of CSS by drug of choice and gender. 2. We then conducted Spearman's rank order correlations between CSS and Percent Days Abstinent (PDA) across all time points. Spearman's rank order correlations were compared with Pearson correlations to assess the influence of the moderately skewed distribution of CSS at the 3-month follow-up. 3. Subsequently, factor structure and internal consistency measures were examined at each time point to assess factorial invariance. Although orthogonal rotation of factors is common in the social sciences (e.g. Varimax rotation) due to ease of interpretation, this method assumes that the factors are uncorrelated. Given that most phenomena are correlated in the social sciences, oblique rotations are considered optimal (Costello & Osborne, 2005). Consequently, we chose an oblique Promax rotation. 4. To assess convergent validity we conducted bivariate Spearman's rank zero order correlations among the CSS and the subscales of the SOCRATES Alcohol Motivation Scale, the subscales of the SOCRATES Drug Motivation Scale, the total scores of both SOCRATES scales (alcohol and drug) and the Commitment to Lifelong Abstinence subscale of the ATAQ. Similarly, we conducted bivariate correlations between the CSS and RBBQ to assess discriminant validity. 5. Finally, we evaluated criterion validity by examining the relationship between CSS and prospective PDA using linear regression models adjusted for predictors of attrition (race and education). We also explored potential CSS score thresholds in relation to future abstinence by plotting the unadjusted bivariate relationships using locally weighted scatter plot and smoothing (LOWESS) graphs. This is a non-parametric exploratory approach that allows the regression line to be influenced and formed "locally" instead of from the entire aggregate of all data points at once (Cleveland, 1988). In order to evaluate the predictive power of the CSS relative to the SOCRATES and ATAQ, we also computed regression models using the same framework to assess the relationship between the two SOCRATES scales (alcohol and drug), the Commitment to Lifelong Abstinence subscale of the ATAQ, and PDA. Finally, to examine the independent criterion validity of the CSS compared to the SOCRATES, we constructed multivariate, linear regression models which included both the CSS and the SOCRATES, controlling for predictors of attrition. All models included standardized beta coefficients and semi-partial adjusted  $R^2$ , which describe the relative magnitude of the association between the described measures of motivation and PDA over the 1-year follow-up period as well as the amount of variance explained by each explanatory variable. This procedure was replicated with the ATAQ and VIF values were

computed to evaluate multicollinearity. All analyses were generated using SAS Version 9.2. Copyright ©2002-2008, SAS Institute Inc., Cary, NC, USA.

### 3. Results

#### 3.1 CSS scores by gender and drug of choice

The distribution of CSS was moderately negatively skewed, but not to the degree that required transformation as indicated by further statistical comparisons. When stratified, we found that there were no significant differences in commitment to sobriety at baseline by patients' primary substance used prior to treatment entry ( $F=1.89$ ,  $df=4$ ,  $p=0.11$ ) or gender ( $t=-1.26$ ,  $p=0.21$ ) (Table 1). Average CSS scores were significantly different at several time points. In keeping with the typical goal of SUD treatment which is to increase commitment to sobriety, baseline CSS was significantly less than end of treatment ( $p=0.001$ ). Also, the baseline CSS was less significantly than 3-month CSS ( $p=0.002$ ). End of treatment CSS was greater than 6-month ( $p=0.023$ ) and 12-month CSS ( $p=0.003$ ), indicating some general weakening of commitment across time after treatment, and, similarly, 3-month CSS was greater than both 6-month ( $p=0.022$ ) and 12-month CSS ( $p=0.003$ ). All other comparisons of CSS across time points were not significantly different ( $p > .05$ ).

The Spearman rank order correlations show that CSS scores were significantly correlated across time. Additionally, CSS scores at each time point were found to be associated with PDA at all prospective time points, respectively (Table 2). These bivariate correlations were compared to the Pearson correlation matrix to assess the degree to which the moderate skewness influenced these relationships; no substantial deviations were identified.

#### 3.2 CSS factor structure and internal consistency

The principal axis factoring extraction yielded a single interpretable factor that was consistent across time points accounting for 69.3, 70.6, 83.1, 81.5 and 83.6% of the variance at baseline, end of treatment, 3-, 6-, and 12-months respectively. Consequently, no factor rotation was necessary. Loadings were all of high magnitude and ranged from 0.792 (item 1 at end of treatment) to 0.953 (item 2 at 6-months) (Table 3). The lowest magnitude loadings, 0.792 and 0.793, were seen for items 1 at end of treatment and item 3 at baseline. The internal consistency for a single factor within the full sample was also very high and ranged from  $\alpha=0.89$  at end of treatment to  $\alpha=0.95$  at 12-months (Table 3). The internal consistency did not appreciably change when any one item was removed.

#### 3.4 Convergent Validity

A weak to moderate convergence with CSS was demonstrated for the subscales of the SOCRATES with the exception of the ambivalence subscale. Similar to the recognition and taking steps subscales, the total scores of the SOCRATES alcohol and drug abstinence motivation scales showed convergence with CSS at baseline and end of treatment. A stronger convergence was seen between the CSS and the Commitment to Lifelong Abstinence subscale of the ATAQ at both baseline ( $r=0.64$ ) and end of treatment ( $r=0.71$ ). The SOCRATES and ATAQ were only administered to participants at baseline and end of treatment and we were therefore only able to assess convergent validity at these time points (Table 4).

#### 3.5 Discriminant Validity

A weak correlation was demonstrated between the RBBQ and CSS at baseline, supporting the discriminant validity of the CSS. The correlation between CSS at baseline and the three constructs of the RBBQ (past year religiosity, lifetime religiosity and religious

identification), ranged between 0.11-0.16 (Table 4). This relationship was only assessed at baseline given that the RBBQ was only administered during the baseline assessment.

### 3.6 Criterion Validity

The criterion validity of the CSS with PDA was verified using regression models, all of which controlled for predictors of attrition (Table 5). Specifically, baseline and end of treatment CSS was significantly associated with PDA at 3-, 6-, and 12-months even when controlling for the total alcohol/drug motivation scores from the SOCRATES or Commitment to Lifelong Abstinence from the ATAQ. Of note, the SOCRATES Alcohol Motivation Scale and the SOCRATES Drug Motivation Scale were significant predictors of PDA at some time points, but to a lesser degree compared to the CSS. The standardized beta estimates for these results revealed that at all time points, the association between CSS and PDA was larger in magnitude compared to that of either of the SOCRATES motivation scales. Additionally, the semi-partial  $R^2$  values show that upon the addition of CSS to a model already containing one of the SOCRATES motivation scales, the additional amount of variance explained by the model increased significantly.

The Commitment to Lifelong Abstinence subscale of the ATAQ was a significant predictor of PDA at all time points (3-, 6- and 12-months). However, when comparing the amount of variance explained univariately by the ATAQ with that of the CSS, the CSS explained a larger proportion of the variance in PDA across the follow-up period. One notable exception was with respect to baseline levels of commitment (ATAQ or CSS) and 3-month PDA, where the ATAQ explained more of the variance in PDA (8.5%) than did the CSS (7.3%). The multivariate models containing both CSS and ATAQ allowed us to evaluate this comparison empirically. Analyses revealed that this consistent pattern of CSS predicting PDA more strongly than the ATAQ was supported statistically, such that the effect of the ATAQ subscale was nullified upon addition of CSS to the model. This was further supported by the significant increase in the amount of variance explained upon the addition of CSS to the model already containing the ATAQ. Again, there was a single exception to this pattern such that baseline level of the ATAQ was a stronger predictor of 3-month PDA than were baseline levels of the CSS ( $p>0.05$ ). Overall, however, the CSS was more consistently a better predictor of PDA across the 1-year follow-up when compared to the Commitment to Lifelong Abstinence subscale of the ATAQ. Additionally, we do not perceive the validity of these results to be threatened by multicollinearity given that the variance inflation factor (VIF) remained less than three for all variables in all analyses.

### 3.7 Subsidiary Analysis

Given the high intercorrelations among the five CSS items, and clinical preference for valid, briefer, measures, we examined also the plausibility and predictive validity of a single-item measure. The CSS item, "I am totally committed to staying off of alcohol/drugs", was selected as the candidate for the single-item measure given that it was the most highly correlated with the total CSS score at baseline ( $r = 0.80$ ) and end of treatment ( $r = 0.82$ ). Criterion validity was examined for both baseline and end of treatment single-item CSS predicting 3-, 6-, and 12-month PDA using the same analysis framework outlined previously (Section 2.3). Although the single-item CSS measure persisted as a significant predictor of outcome at all time points ( $p<.01$ ), it was not as strong as the full 5-item CSS measure, as indicated by lower  $R^2$  values, standardized betas and t-scores (3 month: CSS Full BL = 0.273,  $R^2=6.4\%$  vs. CSS Single Item BL=0.214,  $R^2=3.5\%$ ).

## 4. Discussion

This study examined the potential research and clinical utility of a brief scale measuring the motivational construct of commitment to sobriety. The CSS demonstrated factorial invariance across gender and across time. It also possessed a single latent factor that explained the majority of the variance, and demonstrated reliability via high internal consistencies. The scale evinced acceptable convergent, discriminant, and criterion validity. The CSS shows promise as a useful research tool to help elucidate theories of behavior change in addiction and could be helpful clinically in identifying patients most likely to show higher relapse risk post-treatment.

The CSS maintained a single latent factor structure across time, increasing slightly over the follow-up period in terms of the amount of variance it explained. In keeping with the typical goal of SUD treatment which is to increase commitment to sobriety, the CSS score increased significantly from treatment entry to the end of treatment. Also, the CSS scores showed some attenuation across time. This general, although modest, weakening of commitment to sobriety across time following intensive intervention, is in keeping with the fluctuating aspects of motivation especially in the general absence of the strong motivating inputs that ongoing intensive treatment can provide.

The reliability of the CSS measured using estimates of internal consistency (i.e., Cronbach's alphas) was excellent across every administration over the follow-up period. These results along with the predominant single factor extracted from the factor analysis indicate that this measure is assessing the domain in a reliable and coherent manner. The content of the items on the CSS possess face validity in terms of commitment to sobriety, and the convergent validity estimates with a commonly used "gold standard" measure of motivation (i.e., the SOCRATES) produced moderate positive correlations, as anticipated. The fact that these estimates were not large in magnitude, may be due to the commitment construct being a stronger indication of motivation for abstinence than is captured by the SOCRATES, as alluded to in the introduction and discovered herein empirically. Evidence for discriminant validity was supported by weak correlations with a measure of religious/spiritual practices.

Of note was the consistency of prospectively measured criterion validity of the CSS across time. Controlling for factors associated with participant study attrition, the baseline- and end of treatment-administered CSS predicted subsequent PDA at every single follow-up. Two other commonly used measures of motivation and commitment to abstinence, the Commitment to Lifelong Abstinence subscale and the SOCRATES, showed weaker, inconsistent relationships with PDA at all follow-ups, with only one exception (see Section 3.6). Also, when examined simultaneously in the same model, the CSS at intake and end of treatment predicted outcome independently at every subsequent outcome time point, with the exception of the model containing baseline ATAQ predicting 3-month PDA. Despite this exception, CSS persists as the strongest and most consistent predictor of PDA across the 1-year follow-up period as compared to the ATAQ and SOCRATES.

Examination of the pattern of findings emerging from our exploratory LOWESS analyses suggests that the relationship between CSS scores and PDA is generally linear with a monotonically increasing function without strong indication of threshold effects. On average, however, it appears that a score of 20 or more on the CSS is associated with about 80% or more days of subsequent abstinence across time (Figure 1).

### 4.1. Limitations

Generalizations from the current study should be made with caution in light of certain limitations. The sample is derived from a single private residential facility treating young



adults and, despite being similar in certain characteristics to other programs in the United States, may differ across other important variables that were not measured or available for comparison. Also, although predictors of study attrition were assessed and controlled for when significant, there was considerable attrition especially at the 12-month follow-up. Confidence in the findings is somewhat bolstered, however, by the consistency in the pattern of relationships among study variables across time, but future replications are needed to determine the empirical robustness of our findings.

## 4.2. Conclusions

Motivation for sobriety is a construct central to the SUD treatment and recovery field and the conceptually-related construct of commitment to sobriety, encapsulated within the same nomological net, was operationalized in a brief measure and its psychometric properties examined in this study with a large clinical sample of young adults. Findings indicate the CSS can be considered a valid and reliable measure of commitment to sobriety and is a consistent predictor of future substance use behavior that outperforms the predictive utility of an existing measure of commitment to abstinence (the ATAQ subscale) and a common gold standard measure of motivation in the field – the SOCRATES. A possible reason why the ATAQ, a scale that intends to measure the same construct as the CSS, does not predict PDA as strongly as the CSS may be because, the nature of the items in each scale are measuring different aspects of the construct. All items on the CSS, for example, allude to an intrinsically-based explicit intention to abstain (e.g., “I am totally committed to staying off of alcohol/drugs”), whereas several of the ATAQ items appear to describe an *extrinsically*-based *belief* about what one *ought* to do (i.e. “I should never have another drink/drug”, “I believe I should never use alcohol or any mood altering chemicals again”). While these nuances may appear trivial, they may indeed be tapping in to two different types of commitment; one that result from external sources and contexts as opposed to another driven by personal intention and accountability. The greater internal consistency of the CSS compared to the ATAQ also supports this notion.

In sum, researchers may find the CSS useful as a tool in helping to explain variance in models of substance-related change and, if replicated in other samples, the CSS might prove clinically useful in helping identify patients with low sobriety commitment who may warrant a more intensive or different approach to increase motivation for change.

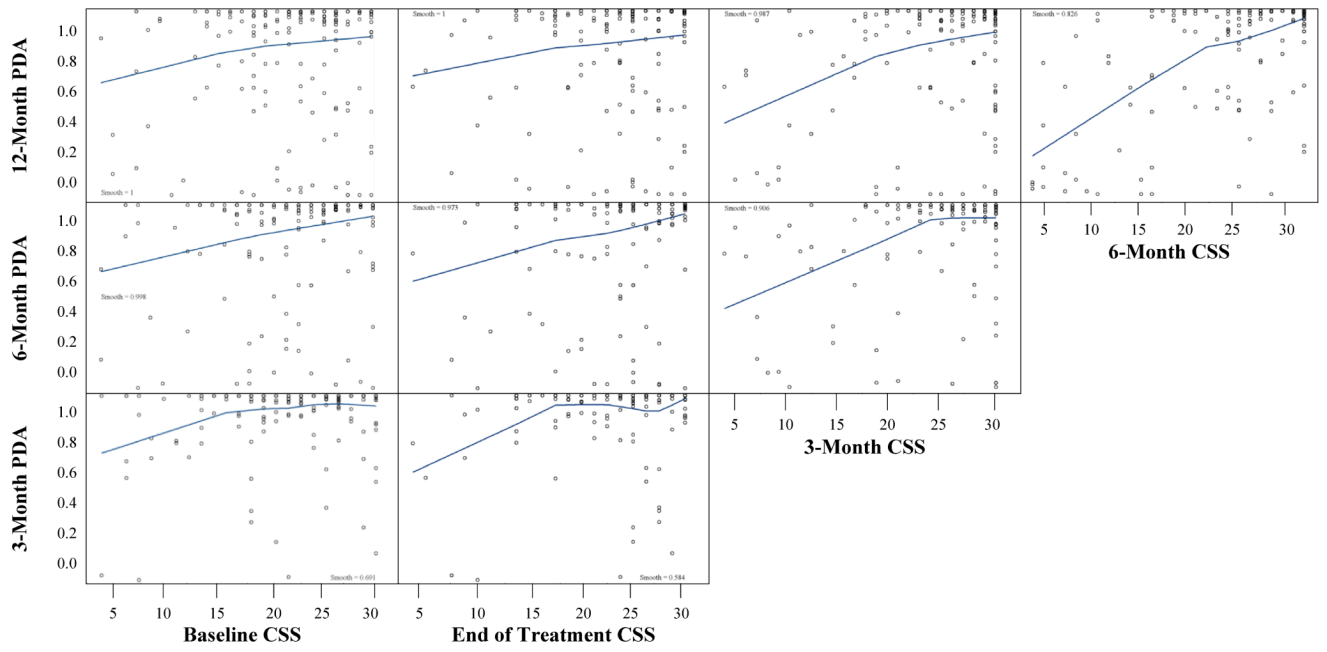
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**Figure 1.**  
CSS and prospective PDA across time points

**Table 1**  
**Sample characteristics and baseline CSS score by primary substance of use and gender**

	N	Mean age	% Male	Mean CSS	Median CSS	CSS Range
<i>Primary Substance</i> <sup>†</sup>						
Alcohol	81	20.74	63.0	23.89	25.00	22.00
Cannabis	81	20.12	86.4	23.56	24.00	20.00
Opiates	65	20.66	78.5	25.32	26.00	22.00
Stimulants	59	19.88	67.8	23.66	25.00	23.00
Other <sup>‡</sup>	13	20.00	76.9	21.69	21.00	22.00
<i>Gender</i>						
Male	223	20.44	--	24.23	25.00	23.00
Female	79	20.10	--	23.37	24.00	23.00
<i>Total</i>	302	20.35	73.8	24.00	25.00	23.00

<sup>†</sup>Not all participants reported drug of choice

<sup>‡</sup>'Other' includes benzodiazepines, DXM, TCB, painkillers and polydrug users

**Table 2**  
**Spearman's rank order correlation between CSS and PDA across time points (0, 3, 6, 12 months)**

	Mean ± SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. CSS Baseline	24.0 ± 5.2	--	0.59**	0.45**	0.47**	0.42**	0.08	0.23*	0.27**	0.24*
2. CSS End of Treatment	25.6 ± 4.4	--	--	0.50**	0.53**	0.45**	0.01	0.26**	0.28**	0.24*
3. CSS 3 Month	25.6 ± 5.8	--	--	--	0.58**	0.51**	-0.06	0.47**	0.37**	0.32**
4. CSS 6 Month	24.4 ± 6.8	--	--	--	--	0.66**	0.10	0.41**	0.67**	0.59**
5. CSS 12 Month	24.0 ± 7.2	--	--	--	--	--	0.04	0.38**	0.48**	0.65**
6. PDA Baseline	24.0 ± 28.1	--	--	--	--	--	--	-0.02	0.11	0.04
7. PDA 3 Month	93.0 ± 17.2	--	--	--	--	--	--	--	0.57**	0.45**
8. PDA 6 Month	87.3 ± 25.9	--	--	--	--	--	--	--	--	0.65**
9. PDA 12 Month	82.2 ± 29.5	--	--	--	--	--	--	--	--	--

\*  $p < .001$

\*\*  $p < .0001$

**Table 3**  
**Individual CSS item loadings and internal consistencies across follow-up timepoints**

<b>Item</b>	<b>Baseline</b>	<b>End of Tx</b>	<b>3-Month</b>	<b>6-Month</b>	<b>12-Month</b>
1. Staying sober is the most important thing in my life	0.813	0.792	0.901	0.874	0.897
2. I am totally committed to staying off of alcohol/drugs	0.881	0.895	0.945	0.953	0.935
3. I will do whatever it takes to recovery from my addiction	0.793	0.854	0.881	0.900	0.931
4. I never want to return to alcohol/drug use again	0.875	0.845	0.922	0.914	0.932
5. I have had enough alcohol and drugs	0.796	0.811	0.908	0.869	0.876
Total Variance Explained by Factor	69.30%	70.57%	83.13%	81.47%	83.64%
Cronbach's Alpha	0.889	0.893	0.949	0.943	0.951

**Table 4**  
**Construct (convergent and discriminant) validity at baseline**

<b>Convergent Validity<sup>†</sup></b>	<b>SOCRATES: Recognition</b>	<b>SOCRATES: Ambivalence</b>	<b>SOCRATES: Taking Steps</b>	<b>SOCRATES: Total</b>	<b>ATAQ: Abstinence Commitment</b>
	<i>r</i>	<i>r</i>	<i>r</i>	<i>r</i>	<i>r</i>
<i>Baseline</i>					0.640***
Alcohol	0.26***	-0.01	0.27***	0.24***	
Drug	0.35***	0.03	0.40***	0.35***	
<i>End of Treatment</i>					0.711***
Alcohol	0.30***	-0.04	0.41***	0.29***	
Drug	0.40***	0.04	0.38***	0.33***	

<b>Discriminant Validity<sup>‡</sup></b>	<b>Past Year Religiosity</b>	<b>Lifetime Religiosity</b>	<b>Religious Identification</b>
	<i>r</i>	<i>r</i>	<i>r</i>
<i>Baseline</i>	0.12*	0.11*	0.16**

<sup>†</sup> Spearman rank order correlations between commitment to sobriety (CSS) and motivation (SOCRATES)

<sup>‡</sup> Spearman rank order correlations between commitment to sobriety (CSS) and religiosity (RBBQ)

\*  $p < .05$

\*\*  $p < .01$

\*\*\*  $p < .0001$

Table 5

Criterion Validity<sup>†</sup>

	3-Month PDA				6-Month PDA				12-Month PDA			
	B	SE	t	Adj. R <sup>2</sup>	B	SE	t	Adj. R <sup>2</sup>	B	SE	t	Adj. R <sup>2</sup>
<b>Baseline</b>												
<i>Unadjusted 1</i>				0.064				0.088				0.089
CSS	0.070	0.016	4.34**	0.273	0.093	0.020	4.58**	0.298	0.080	0.021	3.85**	0.255
<i>Unadjusted 2</i>				0.074				0.046				0.061
ATAQ: Commitment	0.083	0.018	4.67**	0.292	0.077	0.023	3.32**	0.222	0.070	0.024	2.94**	0.199
<i>Unadjusted 3</i>				0.015				-0.003				0.051
SOCRATES Alcohol	0.010	0.004	2.53*	0.163	0.002	0.005	0.034	0.49	0.014	0.006	0.172	2.52*
<i>Unadjusted 4</i>				-0.002				0.018				0.026
SOCRATES Drug	0.008	0.005	1.56	0.101	0.014	0.006	0.153	2.23*	0.006	0.007	0.059	0.85
<i>Adjusted 1</i>				0.075				0.085				0.100
SOCRATES Alcohol	0.008	0.004	1.89	0.120	-0.002	0.005	-0.028	-0.42	0.010	0.005	0.129	1.90
CSS	0.066	0.016	4.03**	0.257	0.095	0.021	3.07	4.58**	0.073	0.021	2.35	3.48**
<i>Adjusted 2</i>				0.061				0.088				0.089
SOCRATES Drug	0.001	0.005	0.11	0.007	0.007	0.006	0.078	1.14	-0.003	0.007	-0.028	-0.39
CSS	0.071	0.017	4.08**	0.275	0.086	0.021	2.80	4.10**	0.084	0.022	2.67	3.79**
<i>Adjusted 3</i>				0.081				0.085				0.085
ATAQ: Commitment	0.055	0.024	2.25*	0.191	0.010	0.031	0.028	0.31	0.013	0.033	0.036	0.39
CSS	0.038	0.022	1.71	0.147	0.087	0.028	2.82	3.14**	0.073	0.029	2.33	2.51*
<b>End of Treatment</b>												
<i>Unadjusted 1</i>				0.089				0.119				0.088
CSS	0.095	0.019	4.90**	0.318	0.120	0.025	3.29	4.85**	0.097	0.025	2.65	3.81**
<i>Unadjusted 2</i>				0.060				0.080				0.070
ATAQ: Commitment	0.086	0.021	4.11**	0.271	0.108	0.026	2.87	4.19**	0.087	0.027	2.27	3.24**
<i>Unadjusted 3</i>				0.010				-0.001				0.036
SOCRATES Alcohol	0.010	0.005	2.24*	0.151	0.005	0.006	0.064	0.89	0.012	0.007	0.129	1.79



	3-Month PDA				6-Month PDA				12-Month PDA			
	B	SE	t	Adj. R <sup>2</sup>	B	SE	t	Adj. R <sup>2</sup>	B	SE	t	Adj. R <sup>2</sup>
<i>Unadjusted 4</i>				0.006				0.011				0.025
SOCRATES Drug	0.010	0.005	0.140	2.06*	0.010	0.006	0.120	1.69	0.009	0.007	0.106	1.45
<i>Adjusted 1</i>				0.089				0.100				0.091
SOCRATES Alcohol	0.004	0.005	0.063	0.93	-0.001	0.006	-0.010	-0.15	0.006	0.007	0.064	0.88
CSS	0.090	0.020	0.303	4.52**	0.121	0.026	0.332	4.72**	0.090	0.026	0.247	3.39**
<i>Adjusted 2</i>				0.090				0.111				0.081
SOCRATES Drug	0.004	0.005	0.062	0.92	0.002	0.006	0.028	0.40	0.003	0.007	0.030	0.40
CSS	0.091	0.020	0.306	4.55**	0.121	0.025	0.334	4.76**	0.093	0.027	0.254	3.46**
<i>Adjusted 3</i>				0.088				0.106				0.086
ATAQ: Commitment	0.028	0.030	0.088	0.94	0.038	0.038	0.100	1.01	0.026	0.040	0.066	0.63
CSS	0.076	0.028	0.256	2.74**	0.093	0.036	0.255	2.55*	0.079	0.038	0.215	2.05*

B: unstandardized parameter estimate; : standardized parameter estimate; R<sup>2</sup>: Semi-partial adjusted R-squared

†All models controlling for predictors of attrition at 3-, 6- and 12-months: education and race

\* p<.05

\*\* p<.01