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Addiction Severity Index (ASI) summary scores: comparison of the Recent Status Scores of the ASI-6 and the Composite Scores of the ASI-5

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Abstract

The characteristics and the validity of the Recent Status Scores (RSSs), the new summary scores generated by the 6th version of the Addiction Severity Index (ASI-6), are compared to the 5th version of the ASI summary scores, the Composite Scores (CSs). A sample of 82 randomly selected patients from substance abuse treatment programs were interviewed with the ASI-6, the ASI-5 and were administered a validity battery of self-questionnaires that included measures corresponding to each of the ASI domains. Each ASI-6 RSS was significantly correlated with its corresponding ASI-5 CS. The intercorrelations among the RSSs are low and none of these correlations was statistically different from the intercorrelations among CSs. In five of the seven areas, the ASI-6 RSSs were more highly correlated to the corresponding validity measures than were the ASI-5 CSs. The ASI-6 offers more comprehensive content in its scales than do those derived with earlier ASIs.

Keywords

Addiction Severity Index; assessment; measurement; validity

1. Introduction

The Addiction Severity Index (ASI) was introduced in the United States in 1980 as a comprehensive instrument designed to assess the impairments that commonly occur in individuals with substance use disorders (SUDs) (McLellan, Luborsky, Woody, & O'Brien, 1980). A slightly modified version of the ASI (ASI-5) was created in 1992 but is essentially the same instrument that was introduced in 1980 (McLellan, et al., 1992). The ASI has been translated in multiple languages and it is probably the most widely used instrument to assess

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the severity of problems in individuals with SUDs in different settings (addiction clinics, mental health settings, prison) and among different populations (substance users seeking treatment, homeless, substance users with co-occurring psychopathology) (McLellan, Cacciola, Alterman, Rikoon, & Carise, 2006).

The combination of changes in the field, new knowledge, and research has revealed limitations to the instrument and led to a major revision of the ASI (Cacciola, Alterman, Habing, & McLellan, 2011; Makela, 2004; McLellan, et al., 2006). Notably, the ASI was updated to reflect current knowledge about substance use disorders and their treatment, fill in other identified gaps in content, and align items with current national databases and standards (McLellan, et al., 2006). There were also some items irrelevant for countries outside of the US (Makela, 2004). A criticism that the 30-day time frame appeared to be too brief to adequately assess baseline functioning and to support cost-analyses (McLellan, et al., 2006) was addressed. Also, various problems with some of the summary scores generated by the earlier ASIs had been identified that we hope to rectify (Cacciola, et al., 2011; Makela, 2004; McLellan, et al., 2006). Modifications were made to facilitate the interview process: the new version provides more structured wording of items to simplify interviewer training and increase reliability; since it is more comprehensive, in order to collect more information but keep the interview brief, the new version includes screening questions with “skip-outs” – a strategy not used in earlier ASIs (Cacciola, et al., 2011).

These major changes to the ASI resulted in the Version 6 of the ASI (ASI-6) (Cacciola, et al., 2011; McLellan, et al., 2006). The ASI-6 remains a multidimensional tool assessing the same seven problem areas assessed by previous versions of the ASI (i.e. medical, employment/ support, alcohol, drugs, family/ social, legal and psychiatric). For each domain, lifetime and past 30-day time frames remain the primary assessment intervals. Also, the so-called “objective” items that document type, duration and frequency of problems and the “subjective” items that query the respondent “how troubled/bothered” by and “how important treatment” is for problems are still preserved. Basically, while some earlier items were retained, the instrument was enhanced with additional content (i.e., new items) and reworded items to increase reliability and validity. Some examples of more comprehensive content include: a 6-month time frame for key variables; information on signs and symptoms of SUDs; items assessing problems and needs regarding children; more family/social support and trauma/victimization items (Cacciola, et al., 2011).

The original ASI summary scores for recent severity are the Composite Scores (CSs; one for each of the seven problem areas) which were based on both rational and empirical methods. Given the considerable evidence for their validity, the CSs represented a formidable accomplishment for their time (Makela, 2004; McDermott, et al., 1996; McLellan, et al., 1985). However, they are not standardized, resulting in skewed scores and different distributions across problem areas. Also, in some areas the internal consistency/reliability of the CSs were not entirely adequate (Alterman, Brown, Zaballero, & McKay, 1994; Hodgins & el-Guebaly, 1992). Nonetheless, the CSs are the most widely reported ASI summary scores (Makela, 2004; McLellan, et al., 2006).

To derive a set of more psychometrically sound of recent severity measures, Nonparametric Item Response Theory (NIRT) analyses were performed using ASI-6 recent status items which resulted in nine summary measures for the ASI-6, called Recent Status Scores (RSSs). There is one summary measure for each of six areas - Medical, Employment/Finances, Alcohol, Drugs, Legal, Psychiatric; and three summary measures derived for the Family/ Social area - Family/ Social Problems, Family/ Social Support, Children Problems. Among the three summary measures in the ASI-6 Family/ Social area, the Family/ Social Problems content corresponds most with that of the ASI-5 Family/ Social CS. As with the ASI-5 CSs, higher RSSs indicate higher impairment. As found with the earlier versions of the ASI, the NIRT analyses supported the multidimensionality of the ASI-6 with relative independence of the nine RSSs. Furthermore, analyses using external measures provided evidence of concurrent validity of the RSSs (Cacciola, et al., 2011). However, comparisons between ASI-5 and ASI-6 summary scores are still needed. The present study compares the characteristics and the validity of ASI-5 CSs and ASI-6 RSSs in a sample of patients from substance abuse treatment programs interviewed with both the ASI-5 and the ASI-6.

2. Methods

2.1 Participants

The sample was derived from a larger sample of 607 patients from ten substance abuse treatment programs who completed the ASI-6 within the first week of their entry into treatment. Among the 607 patients, a subset of 252 patients from six treatment programs (three community and three VA; alternatively, two outpatient, two inpatient and two methadone maintenance) were also administered a battery of instruments for validity analyses. Then, among these 252 patients a group of 82 patients were randomly selected to receive an ASI-5 interview. This study was approved by the necessary Institutional Review Boards (IRBs) and all participants gave written informed consent.

2.2 Assessments

2.2.1 Procedure—Participants were administered the ASI-6 and a validity battery by a trained research technician in one session. The validity battery consisted of self-report questionnaires, the technician only reviewing the instructions and reporting period, and answering questions. The self-report questionnaires were selected for efficiency and to attenuate potential biases of a single technician administering both the ASI-6 and the validity battery as interviews. Another validity measure was derived using arrest data from the Pennsylvania Department of Corrections. The ASI-5 interview was conducted a few days (mean= 2.9 days, SD= 1.2) following the ASI-6 interview by a different trained research technician to alleviate potential biases of a single technician administering both the ASI-6 and the ASI-5 interviews.

2.2.2 ASI interviews—The baseline ASI-6 and ASI-5 were administered, and ASI-6 RSSs (Cacciola, et al., 2011) and ASI-5 CSs (Alterman, et al., 1998) were calculated respectively following authors instructions.

2.2.3 Validity battery—Six self-administered questionnaires were completed by participants in one session. Various scores from these questionnaires were used as external validity measures for the ASI. For the Legal area, criminal records also served as validity measures. A short description of each instrument/variable is given below; more details can be found in the previous paper on the development of the RSSs for the ASI-6 (Cacciola, et al., 2011).

The participants completed the 4-week version of the Short-Form health survey (SF-12) (Ware, Kosinski, & Keller, 1996). The SF-12 Physical score and the SF-12 Mental score were used as external validity measures for the Medical and Psychiatric areas of the ASI, respectively. The score of the Symptom Checklist Revised 10-Item version (SCL-10R) (Rosen, et al., 2000) also was used as an external validity measure for the ASI Psychiatric area. Two scores were derived from the Social Adjustment Scale Self-Report (SAS-SR) (Weissman & Bothwell, 1976). A SAS-SR Work item indicated whether or not the participant worked for pay in the past two weeks and was used as an external validity measure for the ASI Employment area. The second score derived from the SAS-SR was a summary score assessing overall family/social functioning and was used as a validity measure for the ASI Family/Social area. The scores of a 3-month time frame Short Index of Problems (SIP) (Feinn, Tennen, & Kranzler, 2003) and an adapted form for Drugs, SIP-Drugs (SIP-D) (Alterman, Cacciola, Ivey, Habing, & Lynch, 2009) were used as validity measures for the ASI Alcohol and Drugs areas, respectively. The participants also completed the California Psychological Inventory-Socialization scale (CPI-So) (Gough, 1994) which provided a summary measure of antisocial personality. State Criminal records were used to document the number of arrests in the two years prior to study intake (Prior arrests) and the number of arrests in the six months following study intake (Post arrests). These last three variables were used as validity measures for the ASI Legal area.

2.3 Analyses

The ASI-6 RSSs and ASI-5 CSs were calculated, and for each area the percentage of participants who had the lowest possible score value (i.e., no reported problems) were compared between CSs and RSSs using Fisher's exact test. Correlations between RSSs and CSs were calculated using Spearman's ρ correlations. We used non-parametric Spearman's ρ correlations because of both the sample size ($n=82$) and the non-normal distribution of the ASI scores based on Shapiro-Wilk test.

To assess discriminant validity of the ASI scores, an intercorrelation matrix between ASI scores was computed for each ASI version (ASI-6 RSSs and ASI-5 CSs). For each area, the intercorrelation coefficients were compared between the RSS and the CS.

The concurrent validity of each score was assessed by the bivariate non-parametric correlation (Spearman's ρ) between the ASI score (ASI-6 RSS and ASI-5 CS) and the external validity measure(s). The correlation coefficients were then compared between the RSS and the CS.

To diminish the severity of the problem of the multiplicity of statistical tests that were conducted, we treat only the correlations nominally significant at the $p < .001$ level as though they were large enough to be considered statistically significant.

All analyses were performed using JMP® 9.0 (SAS® Institute Inc., Cary, North Carolina, USA).

3. Results

The study sample consisted in 82 patients; mainly African-Americans (54.9%), males (78.8%) with a mean age of 41.1 years ($SD = 10.7$). The characteristics of the sample are presented in Table 1. This sample did not significantly ($p < .05$) differ from the largest ASI-6 validity sample ($n = 607$) except for level of education [10.9 years ($SD = 1.6$) vs. 11.3 years ($SD = 2.1$) for the large sample, $t = -2.16$, $p = 0.03$] and primary substance of abuse. The current sample significantly more often reported opiates (45.7% vs. 23.7%) and less often cocaine (29.6% vs. 46.0%) as their primary substance compared to the largest ASI-6 validity sample ($\chi^2 = 17.03$, $p = 0.002$).

3.1 Description of RSSs and CSs

The mean ASI-6 RSS and ASI-5 CS for each ASI area are presented in Table 2. As expected given the effort to standardize the ASI-6 RSSs, the mean score values were close to 50 with a standard deviation close to 10. Results that compare, in each ASI area, the number of participants who met the lowest possible RSS value with the number of participants who met the lowest possible CS value are presented in Table 2. The percentage of participants who met the lowest possible ASI-5 CS value, that is equal to a 0.00 value, ranged from 0.0% for the Employment area to 48.8% for the Alcohol area. For the seven corresponding RSSs on the ASI-6, the percentage of participants who had the lowest possible score - a value that likewise indicated no reported problems - ranged from 0.0% for the Employment scale to 67.1% for the Legal scale. More specifically, among the seven corresponding scales, in five areas (Medical, Alcohol, Drug, Family/Social Problems, Psychiatric) the ASI-6 RSS had significantly fewer values indicating no reported problems, and in one area (Legal) had significantly more 'no problem' values than did the ASI-5. As indicated above, in the Employment area none of the participants met the lowest possible score value using the ASI-5 or ASI-6 scores. For this area, however, the number of participants who met the highest possible score value was significantly higher using the RSS (74.4%) than using the CS (56.9%).

3.2 Correlations between RSSs and CSs

The bivariate correlations between ASI-6 RSSs and ASI-5 CSs are presented in Table 3. Each RSSs was significantly correlated with its corresponding CS. The Medical, Alcohol, Drug and Psychiatric scales all had correlations higher or equal to 0.70. The remaining scales had more modest correlations [i.e., Employment ($\rho = 0.50$), Legal ($\rho = 0.39$), and Family/ Social Problems ($\rho = 0.38$)]. The Family/ Social problems CS was not significantly correlated with the two other RSS scales related to Family/ Social area, the Family/ Social Support and Children Problems RSSs. There were also significant correlations between

ASI-6 RSSs and non-corresponding ASI-5 CSs. However, the corresponding correlations were always greater than these non-corresponding correlations. The strongest was the Psychiatric RSS with the Medical CS ($\rho = 0.43$); no other non-corresponding correlation was higher than 0.38.

3.3 Discriminant validity of RSSs and CSs

Both the intercorrelations among the nine ASI-6 RSSs and among the seven ASI-5 CSs are, as expected, generally low (Table 4). Nonetheless, there were five significant correlations among the RSSs: Legal with Drug ($\rho = 0.47$); Psychiatric with Medical ($\rho = 0.43$) and Drug ($\rho = 0.35$); and Family/Social Problems with Drug ($\rho = 0.42$) and Psychiatric ($\rho = 0.34$). There were two significant correlations among the CSs. Similar to the ASI-6 RSSs, among the ASI-5 CS's Psychiatric was correlated with Medical ($\rho = 0.35$) and Drug ($\rho = 0.31$). None of the correlation coefficients between RSSs and CSs were significantly different.

3.4 Concurrent validity

The bivariate correlations between ASI-6 RSSs and external validity measures and between ASI-5 CSs and the same external validity measures are presented in Table 5. For the most part, both the RSSs and CSs were significantly correlated with their corresponding validity measures, the partial exceptions were the ASI Legal scores. A total of nine significant correlations of RSSs with non-corresponding validity measures were found, as were six significant correlations of CSs with non-corresponding measures.

Both the Medical RSS and CS were significantly correlated with SF-12 Physical component score ($\rho = -0.59$ and $\rho = -0.49$, respectively). Both were also significantly correlated, but to a lesser degree, with SCL-10R score and SF-12 Mental component score. These correlations with the psychiatric measures are not unexpected as both versions of the ASI revealed significant intercorrelation between the Medical and Psychiatric areas (Table 4). The results show also a significant correlation between the ASI-5 Medical CS and SIP Drug score.

The Employment RSS and the Employment CS were correlated with SAS-SR Work ($\rho = 0.76$ and $\rho = 0.38$, respectively); the correlation was significantly higher with the Employment RSS ($Z = 3.306$, $p = 0.007$). Neither the Employment CS nor the Employment RSS was significantly correlated with any other measures.

The Alcohol RSS and CS were highly correlated with SIP score measuring alcohol use consequences ($\rho = 0.73$ and $\rho = 0.65$, respectively). There were no significant correlations with other measures.

The Drug RSS and the Drug CS were significantly correlated with SIP-Drug score measuring drug use consequences ($\rho = 0.59$ and $\rho = 0.46$, respectively). Results also showed a significant but weaker relationship between the Drug RSS score and SAS-SR Social score. These results parallel the ASI-6 Drug score's significant intercorrelation with the ASI-6 Family/Social Problem score (Table 4).

The Legal RSS and the Legal CS were not well correlated with the corresponding external validity measures. The only significant correlation found was between the Legal CS and the

number of arrests in the prior two years ($\rho = 0.38$). The Legal CS was significantly more correlated with the prior arrests than the Legal RSS ($\rho = 0.04$; $Z = -2.250$, $p < .05$). The highest correlation of the Legal RSS with any of the corresponding validity measures was with number of post arrests ($\rho = 0.24$ vs. Legal CS = 0.08 ; $Z = 0.731$, $p > .05$, NS). Neither ASI Legal score was correlated with the CPI-So (RSS, $\rho = -0.17$; CS, $\rho = -0.07$). The Legal RSS was significantly correlated with a non-corresponding validity measures, the SIP-Drug score ($\rho = 0.37$); not so unexpected insofar the intercorrelation of the Legal and Drug RSSs was the highest intercorrelation among the ASI-6 RSSs ($\rho = 0.47$).

Both the Family/ Social Problems RSS and the Family/ Social CS were significantly correlated with the corresponding external validity measure defined by the SAS-SR Family/ Social summary score ($\rho = 0.34$ and $\rho = 0.44$, respectively). As the Family/ Social Problems RSS was significantly intercorrelated with numerous ASI-6 RSSs, it is not surprising that it was significantly correlated with several other non-corresponding external validity measures: SAS-SR Work ($\rho = -0.38$), SIP-Drug ($\rho = 0.43$), and SF-12 Mental component ($\rho = -0.36$). There were also significant correlations between the Family/ Social CS and SIP-Drug ($\rho = 0.42$), and SCL-10R ($\rho = 0.43$). The Family Support RSS was not significantly correlated with any external validity measures. The Child Problem RSS was effectively uncorrelated with all of the external measures.

Both the Psychiatric RSS and the Psychiatric CS were significantly correlated with psychiatric validity measures assessed by SCL-10R score ($\rho = 0.61$ for both) and SF-12 Mental component ($\rho = -0.65$ and $\rho = -0.51$, respectively). Significant but lower correlations were also found with SAS-SR Social score and with SIP-Drug score. These significant correlations with non-corresponding external measures generally mirror the multiple significant intercorrelations of the ASI Psychiatric scores.

4. Discussion

The aim of this study was to compare the RSSs of ASI-6 and the CSs of ASI-5 in a sample of patients from substance abuse treatment programs interviewed using the ASI-6 and ASI-5 at their treatment entry. By design, seven of the nine RSSs parallel the scales that measure recent functioning derived from earlier versions of the ASI (CSs) (i.e., Medical, Employment, Alcohol, Drug, Legal, Family/Social Problems, Psychiatric), and some content in each pair overlaps. This is the first study to provide data that directly compare the RSSs and CSs. Specifically the study examined and compared the descriptive statistics, the correlations of the two sets of scores, and the discriminant and concurrent validity of the two sets of ASI score.

One problem with the ASI CSs that we tried to rectify with the ASI-6 and the RSSs was the skewed data distributions with many zero values (i.e., no measurable reported problems). This lowest possible value could reflect a true zero value or the zero value could represent a censored value that means that a score of 0.0 was at least this low (Delucchi & Bostrom, 2004). We generally assumed the latter case and enhanced the content of the ASI-6 with one specific goal being to expand the continuum of problems severity, particularly at the lower, less severe end. Also, using nonparametric item response theory (NIRT) in combination

with independent confirmatory non-linear factor analysis, the ASI-6 RSSs aimed to avoid the skewed scores found with ASI-5 CSs and to increase the range of possible score values (Cacciola, et al., 2011). In our sample, for five of the seven ASI areas a significantly smaller percentage of participants met the lowest possible score value using the RSS versus the corresponding CS. For the Legal area, however, the percentage was significantly lower for the CS (vs. the RSS). The items included in the Legal RSS all assess illegal activity, apparently setting a higher bar for identifying problems than with the CS, which also includes the participant's subjective reports regarding the severity of legal problems. In the Employment area, neither ASI measure yielded any participants with the lowest possible score. Conversely, both yielded a high percentage of participants who reached the highest possible values. While the majority of participants reported the most possible problems, significantly more did so using the Employment RSS (vs. the CS). In this sample where the vast majority of participants are concurrently unemployed, what may account for this difference is that the Employment RSS focuses entirely on work and income whereas the CS also includes items about having a driver's license and car. Also likely due to the sample characteristics, the high percentage of participants (79.3%) who met the Children Problems RSS lowest value (i.e. no reported problems), is explained by the small percentage of participants who lived with children. Overall, these results suggest that the lowest RSS values more likely approach true 'zero' values or absence of problem rather than censored values relative to the CSs and suggest an advantage of the ASI-6 over the ASI-5.

Our results showed significant and substantial correlations between the RSSs and their corresponding CSs. They ranged from $\rho = 0.84$ to $\rho = 0.38$, indicating that the ASI-5 and ASI-6 scores of recent functioning while not interchangeable to varying degrees do measure similar constructs. There are also important recent functioning items in most ASI areas (e.g., days of medical problems, days worked for pay, days used alcohol/other specific drugs, experienced depression/anxiety) that are identical, or nearly identical on both versions. This supports the continued value of existing ASI-5 databases (McLellan, et al., 2006). There were significant correlations between non-corresponding RSSs and CSs but these were always less than the corresponding correlations. That the Family/ Social CS was significantly correlated with the corresponding RSS but not with the other two RSSs within the ASI-6 Family/ Social area is evidence that the ASI-6 assesses issues not previously addressed within the ASI-5 Family/ Social area.

The intercorrelations among the nine RSSs and among the seven CSs showed the relative independence of the ASI areas, thus supporting the multidimensionality of both ASI-6 and ASI-5. The significant correlations among areas that were found within the ASI-5 had been identified in previous studies (Alterman, Cacciola, Habing, & Lynch, 2007; Makela, 2004; McDermott, et al., 1996). Two strong correlations between Psychiatric and Medical, and Psychiatric and Drug were found for both the RSSs and the CSs. And, none of the correlations differed significantly between RSSs and CSs. Nonetheless, the Family/ Social Problems RSS was significantly correlated with the Drug RSS; whereas the Family/ Social CS was not significantly correlated with any of the other CSs. Major changes were made to the ASI in the Family/ Social area. The Family/ Social Problems RSS, based on these results (and its correlation with most of the CSs), appears to be less independent than the Family/ Social CSs. Such findings are not necessarily clinically surprising as relationships problems

might affect or be affected by impairments in other areas. Nevertheless, the Family/ Social Problems RSS warrants further research in order to more fully evaluate its validity.

The concurrent validity analyses showed that both ASI-6 RSSs and ASI-5 CSs were for the most part significantly correlated with the corresponding external validity measures. In five of the seven areas, the ASI-6 RSSs were more highly correlated to the corresponding validity measures than were the ASI-5 CSs, but only the Employment RSS was significantly greater. With regard to the validity measures for the Legal area, the CS was significantly more correlated to arrests in the prior two years whereas the RSS was non significantly more correlated to arrests in the 6-month post-intake period. The Legal RSS assesses recent illegal activity in some detail, whereas the CS broadly assesses both recent illegal activity and problems related to involvement in the criminal justice system. Given this difference in item content, it makes sense that the CS is more sensitive to the past arrests and the RSS perhaps more predictive of future arrests. While the difference was not significant, the Family/ Social CS was more highly correlated with the SAS-SR summary score than was the Family/Social Problems RSS. The significant negative correlation between the Family/ Social Support RSS and the SAS-SR score was not unexpected as this was also found in the larger ASI-6 validity sample. One explanation could be that items of the Family/ Social Support RSS assessed interpersonal contact and more problems may exist for respondent who had more support than those who were more isolated (Cacciola, et al., 2011). Also, as found in the ASI-6 validity sample, the Children Problems RSS was not correlated with any of the external measures. However, such findings do not necessarily challenge its validity as the SAS-SR provided a global measure of interpersonal functioning (Cacciola, et al., 2011). Finally, a significant correlations of RSSs and CSs with non-corresponding validity measures were also found and these roughly paralleled the intercorrelations of the ASI scores.

In nearly all of these seven ASI-6 scales the number of items that are included exceeded those in the corresponding ASI-5 scales. Thus, the ASI-6 offers more comprehensive content in its scales than do those derived with earlier ASIs (Cacciola, et al., 2011). This may account for the somewhat higher correlations of the RSSs with most of the validity measures, and which may result in even stronger validity estimates with other relevant measures. For example, the Psychiatric RSS contains trauma-related content which the CS does not. In a previous study, the ASI-5 and ASI-6 recent psychiatric measures performed similarly in identifying overall psychiatric co-morbidity, but the ASI-6 performed better for PTSD (Rush, Castel, Brands, Toneatto, & Veldhuizen, 2013).

Select items from the earlier ASIs appeared irrelevant for countries outside of the U.S., for instance, having access to a car in the Employment area, or specific criminal charges in the Legal area that differ across countries (Makela, 2004). The ASI-6 RSSs include items that may be less affected by cultural or country context. Thus, some barriers to summary scores that might be comparable regardless of country or cultural context have been removed. Translations of the ASI-6 into other languages and promising validity have been accomplished in other countries (e.g., Spain, Brazil) (Diaz Mesa, et al., 2010; Kessler, et al., 2012). However, further studies are needed to compare the ASI-6 with the ASI-5 in countries outside the U.S..

There are several limitations of the study, some that suggest directions for future research. Compared to the recent data on the U.S. specialty substance abuse treatment-seeking population age and gender are similar, but notably the sample has proportionately more African-Americans, a higher percentage of primary opiate use and lower percentage of primary alcohol use (Substance Abuse and Mental Health Services Administration, 2011). While relatively small, it was a randomized sample from a larger one, including patients from multiple substance abuse treatment organizations and modalities, and may not be dissimilar in important ways from an urban, particularly inner city, U.S. treatment-seeking population. A larger and more socio-demographically diverse sample would increase the relevance of and confidence in the findings. Whereas alternating the test (ASI-6, ASI-5) order may be ideal, as the primary purpose of the larger study was testing the ASI-6, it was always administered on the first day to maximize the overall ASI-6 sample. Also, as the ASI-5 can be considered a validity measure for the ASI-6, same day administration of the two measures is arguably ideal. Since the two versions of the ASI had similar and overlapping items an interval of a few days between administrations was selected to minimize rote recall and reporting. This approach has been taken previously in evaluating different versions of the ASI (Cacciola, Alterman, McLellan, Lin, & Lynch, 2007), and the validity measures used in this study were consistent with previous studies evaluating the validity of the ASI in larger samples (Alterman, Bovasso, Cacciola, & McDermott, 2001; Alterman, et al., 1998; Cacciola, et al., 2011; Makela, 2004). As this study was conducted with patients at treatment entry, future studies might address whether such findings are replicable with follow-up assessments. Furthermore, the comparable validity of the RSSs and CSs found at intake (i.e., cross-sectional) does not mean that the RSSs would be comparably valid measures of change, an issue worth examination as well.

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Table 1
Characteristics of the sample (n=82)

		Study sample (n= 82)
Males	n (%)	63 (78.8)
Race	n (%)	
	African American	45 (54.9)
	Caucasian	31 (37.8)
	Other	6 (7.3)
Age (years)	Mean (SD)	41.1 (10.7)
Education (years)	Mean (SD)	10.9 (1.6)
Employed - past 30 days	n (%)	19 (23.2)
Marital Status	n (%)	
	Married/ Living as married	9 (11.1)
	Widowed	3 (3.7)
	Divorced/ Separated	28 (34.6)
	Never Married	41 (50.6)
Living with children	n (%)	16 (19.5)
No. prior substance abuse treatments	Mean (SD)	5.5 (5.3)
Years regular Alcohol use	Mean (SD)	10.5 (11.8)
Days Alcohol use - past 30 days	Mean (SD)	4.7 (8.1)
Years regular Drug use	Mean (SD)	16.2 (10.8)
Days Drug use - past 30 days	Mean (SD)	9.3 (10.4)
Primary substance of abuse	n (%)	
	Opiates	37 (45.7)
	Cocaine	24 (29.6)
	Alcohol	15 (18.5)
	Cannabis	3 (3.7)
	Other	2 (2.5)
Legally mandated to Substance Abuse Treatments	n (%)	19 (23.8)
History of arrest	n (%)	74 (91.4)
No. Inpatient Psychiatric Treatments - lifetime	Mean (SD)	1.3 (3.5)
Days Psychological problems - past 30 day	Mean (SD)	13.5 (12.8)
No. Medical Hospitalizations -lifetime	Mean (SD)	3.4 (6.0)

		Study sample (n= 82)
Days Physical problems - past 30 days	Mean (SD)	12.2 (12.6)

Notes: SD = Standard Deviation

Table 2
Descriptive statistics of the ASI-6 Recent Status Scales (RSSs) and the ASI-5 Composite Scores (CSs) (n= 82)

	ASI-6 RSS	ASI-5 CS	χ^2 , p-value
Medical Status			
Mean (SD)	50.0 (9.7)	0.43 (0.29)	
Lowest value n (%)	2 (2.4)	31 (37.8)	29.3, p< 0.0001
Employment			
Mean (SD)	49.7 (6.7)	0.84 (0.21)	
Lowest value n (%)	0 (-)	0 (-)	NS
Highest value n (%)	61 (74.4)	37 (56.9)	8.20, p= 0.006
Alcohol			
Mean (SD)	48.5 (9.0)	0.16 (0.26)	
Lowest value n (%)	20 (24.4)	40 (48.8)	8.79, p= 0.003
Drug			
Mean (SD)	49.4 (10.1)	0.18 (0.15)	
Lowest value n (%)	5 (6.1)	22 (26.8)	11.65, p= 0.0006
Legal Status			
Mean (SD)	50.8 (8.0)	0.19 (0.22)	
Lowest value n (%)	55 (67.1)	35 (42.7)	13.36, p= 0.0004
Family/ Social			
Family/ Social Problems			
Mean (SD)	49.3 (8.4)	0.14 (0.18)	
Lowest value n (%)	11 (13.4)	32 (39.5)	12.68, p= 0.0004
Family/ Social Support			
Mean (SD)	51.6 (9.9)	-	
Lowest value n (%)	1 (1.2)	-	
Child Problems			
Mean (SD)	50.3 (5.4)	-	
Lowest value n (%)	65 (79.3)	-	
Psychiatric Status			
Mean (SD)	49.2 (10.4)	0.30 (0.26)	
Lowest value n (%)	5 (6.1)	25 (30.5)	14.94, p< 0.0001

Notes: SD = Standard Deviation; χ^2 = Comparison test of the prevalence of the lowest possible score value between ASI-6 RSS and ASI-5 CS, p-value= Fisher's Exact Test p-value

Table 3
Correlations between the ASI-6 Recent Status Scales (RSSs) and the ASI-5 Composite Scores (CSs) (n= 82)

ASI-6/ ASI-5	Medical	Employ.	Alcohol	Drug	Legal	Family/ Social			Psy
						FP	FS	CP	
Medical	0.73	- 0.000	0.17	0.26	0.01	0.26	- 0.04	- 0.18	0.43
Employ.	-0.06	0.50	- 0.07	- 0.20	- 0.000	- 0.31	- 0.37	0.003	- 0.25
Alcohol	0.16	- 0.13	0.77	- 0.008	0.008	0.26	0.23	- 0.09	0.21
Drug	0.29	0.02	- 0.11	0.84	0.34	0.35	0.07	0.11	0.38
Legal	0.03	0.003	- 0.04	0.38	0.39	0.07	0.04	- 0.05	- 0.11
Fam/Soc.	0.10	- 0.19	0.10	0.32	0.30	0.38	- 0.13	0.08	0.22
Psy.	0.36	0.03	0.08	0.26	- 0.11	0.20	- 0.12	- 0.03	0.70

Notes: Medical= Medical Status, Employ.= Employment, Alcohol= Alcohol, Drug= Drugs, Fam/ Soc.= Family/ Social (ASI-5), FP= Family/ Social Problems (ASI-6), FS= Family/ Social Support (ASI-6), CP= Children Problems (ASI-6), Psy= Psychiatric Status.

Significant correlations were indicated by **bold** values (p < .001).

Table 4
Intercorrelations (Spearman's ρ correlations) between the ASI-6 Recent Status Scales (RSSs) and between the ASI-5 Composite Scores (CSSs)

	Employ.	Alcohol	Drug	Legal	Family/ Social		Psy
ASI - 6					FP	FS	CP
Medical	0.002	0.19	0.22	0.02	0.28	- 0.02	- 0.17 0.43
Employ.		- 0.11	- 0.05	0.11	- 0.30	- 0.11	- 0.05
Alcohol			- 0.08	- 0.05	0.27	0.16	- 0.13 0.13
Drug				0.47	0.42	0.16	0.06 0.35
Legal					0.13	0.04	- 0.003
FP						0.15	- 0.004 0.34
FS							0.20 0.03
CP							0.02
ASI-5							
Medical	- 0.04	0.21	0.26	- 0.12	0.23		0.35
Employ.		- 0.06	- 0.15	- 0.06	- 0.17		- 0.12
Alcohol			0.02	0.11	0.14		0.13
Drug				0.27	0.23		0.31
Legal					0.09		- 0.11
Fam/Soc.							0.21

Notes: Medical= Medical Status, Employ.= Employment, Alcohol= Alcohol, Drug= Drugs, Fam/ Soc.= Family/ Social Problems (ASI-6), FS= Family/ Social Support (ASI-6), CP= Children Problem (ASI-6), Psy= Psychiatric Status.

Significant correlations were indicated by **bold** values ($p < .001$).

Table 5

Correlations (Spearman's ρ) between ASI-6 RSSs and external validity measures and between ASI-5 CSs and external validity measures (n=82).

		External Validity Measures ^a								
	SF-12 Physic al	SAS- SR Work ^b	SIP	SIP- D	CPI- So	Prior arrests ^c	Post arrests ^d	SAS- SR Social	SCL- 10R	SF-12 Mental
Medical										
ASI-6	- 0.59	- 0.05	0.22	0.26	-0.16	0.05	- 0.23	0.24	0.42	- 0.33
ASI-5	- 0.49	- .007	0.23	0.36	-0.18	- 0.19	- 0.07	0.29	0.45	- 0.33
Employ.										
ASI-6	- 0.11	0.73	-0.10	-.05	-0.13	0.22	0.22	0.02	0.01	0.13
ASI-5	- 0.001	0.38	-0.03	-.32	-0.24	0.11	0.02	- 0.03	-0.06	0.18
Alcohol										
ASI-6	- 0.05	- 0.15	0.73	0.06	-0.05	- 0.15	- 0.31	0.16	0.27	- 0.19
ASI-5	- 0.05	- 0.08	0.65	0.29	-0.06	-0.14	- 0.17	0.22	0.32	- 0.24
Drug										
ASI-6	- 0.19	- 0.18	-0.28	0.59	-0.17	- 0.21	0.13	0.34	0.28	- 0.31
ASI-5	- 0.28	- 0.09	-0.23	0.46	-0.07	- 0.21	- 0.04	0.25	0.30	- 0.26
Legal										
ASI-6	- 0.13	0.15	-0.10	0.37	-0.12	0.04	0.24	0.14	0.07	- 0.08
ASI-5	0.06	0.02	-0.18	0.21	-0.10	0.38	0.08	0.06	0.04	- 0.12
Fam./Soc										
ASI-6										
FP	- 0.17	- 0.38	0.32	0.43	-0.06	- 0.24	- 0.19	0.34	0.27	- 0.36
FS	- 0.18	- 0.04	0.05	0.01	0.14	- 0.16	0.06	- 0.30	-0.16	0.01
CP	- 0.007	0.03	-.17	-.06	0.12	- 0.13	0.05	- 0.15	-0.15	0.01
ASI-5	0.02	- 0.13	0.01	0.42	-0.15	- 0.20	- 0.07	0.44	0.43	- 0.25
Psy										
ASI-6	- 0.15	- 0.05	0.15	0.39	-0.17	- 0.16	0.01	0.36	0.61	- 0.65
ASI-5	- 0.25	0.03	0.11	0.30	-0.25	- 0.08	- 0.07	0.44	0.61	- 0.51

Notes:

^a Higher scores on the Social Adjustment Scale - Self-Report (SAS-SR), Short Index of Problems (SIP), Short Index of Problems - Drugs (SIP-D), Number of arrests in prior 2 years (Prior Arrests), Number of arrests in the 6-month period following the ASI interview (Post arrests), and Symptom Checklist Revised 10-Items Version (SCL-10R) indicate more problems. Higher scores on the Short Form-12 (SF-12) and California Psychological Inventory - Socialization Scale (CPI-So) indicate fewer problems;

^b Employed versus not employed;

^c Number of arrests in prior 2 years;

^d Number of arrests in the 6 months after the ASI intake interview.

Significant correlations were indicated by **bold** values ($p < .001$).