

Reliability and Validity of the Addiction Severity Index Among Outpatients With Severe Mental Illness

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This study provides psychometric data for the Addiction Severity Index (ASI) when administered to persons with severe and persistent mental disorders. Participants were 97 outpatients (26 women) at a public psychiatric facility. The internal consistency of the composite scores was lower in this psychiatric sample than in previous nonpsychiatric samples. Interrater reliability was acceptable for most composite scores but low for many severity ratings. Several scores showed low temporal stability. Validity evidence was weak for the employment and family–social subscales, acceptable for drug and alcohol subscales, and mixed for psychiatric, medical, and legal subscales. Due to mixed reliability and validity evidence, caution should be exercised when using the ASI with patients having severe mental illness.

The Addiction Severity Index (ASI; McLellan, Luborsky, Woody, & O'Brien, 1980; McLellan et al., 1992) is a structured interview that is widely used in addictions research and treatment contexts. The ASI was originally designed for use in alcohol and drug treatment settings as an intake assessment and outcome evaluation tool. It covers seven problem areas: medical status, employment status, legal problems, family–social relations, drug use, alcohol use, and psychiatric status. The interview yields two sets of summary scores for each problem area: interviewer severity ratings (ISRs) and composite scores (CSs). The ISRs consist of the interviewer's subjective evaluation of the need for additional treatment in a given area. The CSs represent a linear composite of interrelated items within a specific problem area, suitable for evaluating change over time and other research purposes.

Psychometric research has provided substantial evidence for the reliability and validity of the ASI with primary substance abusers. Two studies conducted by McLellan et al. (1980, 1985) suggest that raters can assign ISRs reliably for clients entering substance abuse treatment. Hodgins and El-Guebaly (1992) reported that the presence of a primary psychiatric disorder may reduce interrater agreement on some ASI scores. With regard

to temporal stability, McLellan et al. (1985) found ISR concordance estimates to be .92 or higher after a 3-day interval. However, Drake, McHugo, and Biesanz (1995) reported that psychiatric severity had a significant negative impact on the temporal stability of CSs in a sample of homeless persons with alcohol and drug problems. Hendricks, Kaplan, Limbeek, and Geerlings (1989) evaluated the internal consistency of the CSs with 142 Dutch drug abusers; only the employment subscale yielded a low alpha (.58). Alphas reported for a sample of 152 psychiatric substance abusers tended to be lower; the legal, drug abuse, family–social, and employment subscales all fell in the unacceptable range (Hodgins & El-Guebaly, 1992). These studies suggest that sampling differences, specifically psychiatric severity, may adversely affect many of the reliability indices.

Correspondence between ISRs and corresponding CSs tend to be high in samples of substance abusers (Hendricks et al., 1989; McLellan et al., 1985) but weaker in a psychiatric sample (Hodgins & El-Guebaly, 1992), especially on the legal and employment subscales where the scores were unrelated. The absence of the expected correlations in the legal and employment subscales raises questions about the validity of these scores among psychiatric patients. Adequate evidence for the concurrent and discriminant validity of the ISRs was provided in multiple studies with substance abuse treatment samples (Hendricks et al., 1989; Kosten, Rounsaville, & Kleber, 1983; McLellan et al., 1985). No validity data are available on substance abusers with major psychiatric disorders.

Further evaluation of the ASI's psychometric properties in a psychiatric sample is needed. The Epidemiological Catchment Area Study revealed that nearly half of persons with schizophrenia and one third of persons with affective disorders have had lifetime problems with alcohol or drugs (Regier et al., 1990). However, substance use disorders in this population often go undetected (Ananth et al., 1989; Safer, 1987; Shaner et al.,

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1993). Psychiatrically impaired substance abusers often receive treatment at mental health centers, where intake procedures do not always adequately address substance abuse patterns and related life problems. Furthermore, nonproblematic moderate drinking is rarely maintained as a stable pattern among those with severe mental illness and typically develops into an alcohol use disorder (Drake & Wallach, 1993). These findings suggest that substance use should be assessed at intake and closely monitored throughout treatment, even among those who do not meet abuse or dependence criteria. The strength of the existing psychometric data, as well as the multidimensional assessment approach of the ASI, makes it a natural choice for use in assessment and treatment planning among those with severe mental illness. The ASI has been recommended to investigators working in psychiatric settings (Hodgins & El-Guebaly, 1992; Ries, 1994), although little empirical research exists evaluating the adequacy of this instrument among persons with major mental disorders.

The Hodgins and El-Guebaly (1992) study provides the only published data on the psychometric properties of the ASI within a psychiatric sample, and the generalizability of their results to other mental health settings needs to be established. Their participants were seeking dual diagnosis treatment, while the majority of patients with co-occurring psychiatric and substance disorders present problems other than substance abuse and may give less accurate reports of their substance abuse and related problems. In addition, only 19% of their sample received a diagnosis of schizophrenia, although such individuals represent a large subset of consumers of outpatient mental health services. Finally, temporal stability was not assessed, and the lack of independent measures of each problem area limits the strength of the validity evidence. Our investigation was designed to replicate and extend extant findings regarding the psychometric properties of the ASI among outpatients with severe and persistent mental illness.

Method

Participants were 97 outpatients (71 men, 26 women) at a public psychiatric facility, between the ages of 22 and 62 ($M = 39.5$ years, $SD = 9.1$).¹ The majority were White (84%), unmarried (95.5%), and not in the workforce in the last month (73%). The Primary Axis I diagnosis established by the Structured Clinical Interview for *DSM-III-R* (SCID; Spitzer, Williams, Gibbon, & First, 1990; *Diagnostic and Statistical Manual of Mental Disorders*, 3rd ed., rev., 1987) was conducted by a doctoral-level clinical psychologist. A subset of 14 interviews were conducted with a second doctoral-level clinical psychologist present to evaluate interrater reliability; $\kappa = 1.00$ was obtained for the primary diagnosis. Most (53%) participants had a primary diagnosis of schizophrenia, with the remainder distributed as follows: schizoaffective disorder (13%), bipolar disorder (23%), and other (11%). Nearly all (93%) were taking psychiatric medications, inpatient hospitalizations were frequent ($M = 9.1$, $SD = 9.9$), and 90% received a psychiatric disability pension. The mean Global Assessment of Functioning (GAF) was 46.8 ($SD = 10.9$), indicating the presence of serious symptoms or serious impairment in social or occupational functioning. At the time of assessment, 22% of the participants had a current *DSM-III-R* diagnosis of substance abuse or dependence and 57% had formerly met criteria for substance abuse or dependence (but not in the last 6 months). Previous alcohol-specific treatment was reported by 37% of this sample, while

21% had received drug-specific treatment; 26% used drugs and 29% had consumed alcohol in the last month. This subset of recent users ($n = 37$) did not differ substantially from the full sample on any of the demographic or diagnostic variables.

Interrater reliability for both the ISRs and the CSs was determined for 32 participants. A second rater was present or scored the ASI after listening to an audiotape of each interview. Test-retest reliability was assessed for 10 participants; retests were conducted 3–10 days after the first administration by the same interviewer. Validity evidence was derived from ASI items not included in the calculation of the summary scores as well as independent measures with sound psychometric properties, all of which were validated in psychiatric samples (cf. extended report). The validation for the legal scale comes from two ASI items: current probation–parole status and number of convictions. The ASI item regarding presence of chronic medical problems was used to validate the medical scale, as was the somatization scale of the Symptom Checklist 90–Revised (SCL-90-R; Derogatis, 1983). The validation for the employment and family–social scales comes from the Social Adjustment Scale II (SASII; Schooler, Hogarty, & Weissman, 1979), a semistructured interview designed to assess the social role functioning of chronic outpatients with schizophrenia. The summary score for work role and total mean score were used in this study. The validation for the psychiatric scale comes from the global severity index (GSI) of the SCL-90-R and the GAF from the SCID interview (Spitzer et al., 1990), which takes into account psychiatric symptoms and social and occupational functioning. The validation for the alcohol and drug scales comes from several established substance abuse measures. The Michigan Alcoholism Screening Test (MAST; Selzer, 1971) is a 25-item measure of lifetime negative consequences associated with alcohol. Similarly, the Drug Abuse Screening Test (DAST; Skinner, 1982) is a 20-item measure of negative consequences due to drug abuse during the past year. Therapists completed the Alcohol and Drug Clinician Rating Scales (CRS; Drake, Osher, & Wallach, 1989); scores ranged from “no use” to “use resulting in extremely severe problems” (corresponding to *DSM-III-R* abuse and dependence criteria) over the last 6 months.

Results and Discussion

Table 1 contains means and standard deviations of the ISRs and CSs for the whole sample, the subset of participants who had used drugs or alcohol in the last month, and the smaller subset with current alcohol or drug use disorders. Note that the ISRs indicate the need for treatment in a given area, beyond what is already provided. Because our participants were outpatients at a mental health center and already receiving treatment, the ISRs cannot be interpreted as indices of problem severity (as can the CSs) but rather as the need for additional services not currently provided.

Internal Consistency

Weighted item scores were used to determine the internal consistency of the CSs (see Table 2). In all groups, the family–

¹ A total of 105 outpatients provided ASI data for this study. However, 8 participants were excluded from the analyses on the basis of interviewer confidence ratings. These confidence ratings are standard items in the ASI; they allow the interviewer to indicate, after each section, whether distortions due to patient misrepresentation or inability to understand are suspected. If two or more of the seven sections were flagged by the interviewer as of questionable validity, we elected to exclude that case from the analyses. Thus, our sample represents only those participants who provided meaningful data, to the best of our knowledge.

Table 1
Means and Standard Deviations of Interviewer Severity Ratings and Composite Scores for the Full Sample and Selected Subsets

Addiction Severity Index subscale	Full sample (<i>n</i> = 97)		Subset who used alcohol or drugs in last month (<i>n</i> = 37)		Subset with a current abuse-dependence diagnosis (<i>n</i> = 21)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Interviewer severity ratings						
Alcohol	1.33	1.96	2.03	2.18	2.57	2.50
Drug	1.44	2.56	2.78	3.18	3.43	3.43
Employment	1.03	1.69	1.30	1.80	1.55	2.06
Legal	0.32	1.08	0.69	1.63	0.71	1.38
Family-social	2.42	2.16	3.06	2.03	3.25	1.94
Medical	1.83	2.28	2.03	2.27	2.62	2.54
Psychiatric	3.61	2.17	4.00	2.14	4.30	2.08
Composite scores						
Alcohol	.051	.080	.089	.098	.098	.113
Drug	.022	.047	.042	.063	.063	.077
Employment	.810	.246	.791	.276	.746	.275
Legal	.017	.059	.032	.081	.039	.082
Family-social	.156	.164	.205	.166	.213	.156
Medical	.277	.325	.336	.335	.428	.372
Psychiatric	.337	.191	.365	.205	.434	.225

social CS is consistently low. Only the medical and psychiatric CSs reached the acceptable range for internal consistency (i.e., over .70; Cicchetti, 1994) for the substance use disorder group. For several of the scales, deletion of one or more items raised the alpha. The values in parentheses in Table 2 reflect the estimated alpha, with indicated items deleted from the scale. Such adjustment raises the alphas for all of the scales in the subset of current abusers. Even so, only three scales exceeded the .70 guideline. These findings replicate those of Hodgins and El-Guebaly (1992), who also found four unacceptably low alphas in a treatment-seeking psychiatric sample. Taken together, it

appears that the internal consistencies of the CSs are lower when substance abuse disorders co-occur with major psychiatric disorders. Investigators should be cautious in interpreting the CSs with psychiatric samples because items making up the CSs may not be highly related and some of the items are infrequently endorsed.

Interrater Reliability

Interrater consistency was calculated for 32 participants. Intraclass correlation coefficients (ICC; Bartko & Carpenter,

Table 2
Alpha Coefficients for Composite Scores for Three Groups of Participants

Scale	Full sample (<i>n</i> = 97)	Subset who used alcohol or drugs in last month (<i>n</i> = 37)	Subset with a current abuse-dependence diagnosis (<i>n</i> = 21)
Alcohol	.51 (.62) ^a	.49 (.58) ^a	.57 (.76) ^a
Drug	.57 (.66) ^b	.56 (.66) ^b	.62 (.67) ^b
Employment	.66	.74	.65 (.69) ^c
Legal	.51 (.58) ^d	.52 (.58) ^e	.34 (.40) ^d
Family-social	.46 (.59) ^f	.32 (.59) ^f	.15 (.56) ^f
Medical	.85	.82	.83 (.91) ^g
Psychiatric	.64 (.66) ^h	.70	.70 (.71) ^h

Note. Values in parentheses reflect coefficient alpha minus one of the items. Superscripts identify which Addiction Severity Index item would be deleted to raise the alpha coefficient.

^a How important to you is treatment for alcohol problems? ^b Number of days using sedatives-hypnotics-tranquilizers in the past 30 days. ^c How many days were you paid for working in the past 30 days? ^d Are you awaiting charges, trial, or sentencing? Yes-No. ^e Amount of illegal income in the last 30 days. ^f Are you satisfied with your marital status? Yes-No. ^g How important to you now is treatment for these medical problems? ^h Have you attempted suicide in the past 30 days? Yes-No (not endorsed by any participant).

Table 3
Interrater Reliability for Addiction Severity Index (ASI)

ASI subscale	Composite scores		Interviewer severity ratings	
	Interrater reliability subset ($n = 32$)	Subset who used alcohol or drugs in the last 30 days ($n = 10$)	Interrater reliability subset ($n = 32$)	Subset who used alcohol or drugs in the last 30 days ($n = 10$)
Alcohol	.81	0.98	.68	.41
Drug	.94	0.96	.91	.95
Employment	.99	0.99	.34	.27
Family-social	.91	0.97	.46	.44
Legal	.52	0.34	.57	.67
Medical	.90	1.00	.73	.27
Psychiatric	.98	0.98	.69	.60

1976) appear in Table 3. For the CSs, all interrater reliability coefficients were in the excellent range, except for the legal CS. However, ISRs for three scales (employment, family, legal) showed poor-fair interrater agreement. Within the interrater reliability sample, we also calculated ICCs on the subset of 10 participants who reported abusing alcohol or drugs in the last month. The pattern for the CSs was identical: Reliability coefficients were excellent with the exception of the legal scale. However, the reliability coefficients for the ISRs in the current user subset changed substantially. Because of the small sample, some instability is to be expected; thus, the high level of interrater agreement on the more objectively based CSs is all the more notable.

ISRs were not meant to be used as outcome measures because extensive reliability training would be required (McLellan et al., 1992). Although acceptable interrater agreement on ISRs is usually found in primary substance abuse treatment samples, it appears that subjective judgments contributing to ISRs become less reliable in the presence of a major mental disorder. This conclusion is even more justified because our approach (using a primary rater-interviewer and a second rater-observer) used a single interview and was therefore more likely to be biased toward higher interrater reliability. Our findings suggest that the use of the ISRs in psychiatric samples requires a demonstration of adequate interrater reliability.

Temporal Stability

Test-retest reliability was calculated for a subset of 10 participants. Pearson correlation coefficients for the ISRs were, in ascending order, psychiatric = .39, medical = .43, legal = .50, alcohol = .64, employment = .86, family = .88, and drug = .90. Test-retest reliability coefficients for the CSs revealed greater variability among scores: alcohol = .16, drug = .21, medical = .48, family = .80, employment = .83, psychiatric = .86, and legal = .94. These reliability coefficients suggest that scores on many of the scales changed substantially from test to retest. To test the possibility that participants became more comfortable with the interviewer and revealed more information on the second administration, we compared the mean scores with correlated t tests and found no significant differences due to time of administration on either ISRs or CSs. A closer inspection of the

items comprising the less stable CSs revealed many referring to estimates of money spent or daily frequency of an event in the last 30 days. Between 66% and 92% of the items on the alcohol, drug, and medical scales called for such estimates, whereas between 11% and 50% of the remaining scales called for such numeric estimates. Thus, the CSs demonstrating the most instability were those most likely to be affected by actual behavior change during the week-long test-retest interval. We caution, however, that these findings are based on a small retest sample. Given the relative lack of attention given to temporal stability in the ASI literature, our findings suggest that this aspect of reliability warrants additional investigation.

Validity

The subset of 37 patients who reported using alcohol or drugs in the last month was used for the following analyses. When the relationship between the CSs and their respective ISRs was examined, only the employment scale did not show the expected correspondence (see Table 4). The mean correlation between CSs and ISRs was .61. This value is lower than the .88 reported by McLellan et al. (1985) and the .73 reported by Hendricks et al. (1989) but compares favorably with the .45 found by Hodgins and El-Guebaly (1992) with a larger sample.

Evidence for concurrent and discriminant validity for the CSs and ISRs is summarized in Tables 5 and 6. The criterion for establishing discriminant validity consists of finding stronger relationships between corresponding measures than noncorresponding measures. With regard to CSs, only the drug scale demonstrated both convergent and discriminant validity. The alcohol, legal, medical, and psychiatric subscales did not receive strong validity support. These CSs did have their highest correlations with one of their designated validation measures, but either did not correlate as expected with both validation measures or had stronger associations with validation measures in other areas. The family-social CS did not demonstrate the expected relationship with its external validation measure.

With regard to the ISRs, both the alcohol and drug ISRs met the strong test of convergent and discriminant validity. However, the legal, medical, and psychiatric ISRs did not correlate significantly with one of their designated validation measures and exhibited stronger correlations with measures corresponding to

Table 4
Correlation Matrix of Composite Scores With Interviewer Severity Ratings

Interviewer severity rating	Composite score						
	1	2	3	4	5	6	7
1. Alcohol	.86***	.04	.11	-.04	.20	-.14	.10
2. Drug	.00	.70***	.10	.36*	.06	.17	.34*
3. Employment	-.22	.39**	-.09	.09	.13	.46**	.20
4. Legal	.16	.09	-.10	.80***	.15	-.10	-.06
5. Family	.28	.33	-.10	.05	.53***	.29	.52**
6. Medical	-.01	.51***	-.10	-.10	.30	.66***	.64***
7. Psychiatric	.13	.60***	-.07	.11	.19	.57***	.64***

Note. $n = 37$ participants who have used alcohol or drugs in the last month. Boldface represents correlations between Composite Scores and Interviewer Severity Ratings. Correlations below the diagonal represent intercorrelations among Interviewer Severity Ratings. Correlations above the diagonal represent intercorrelations among Composite Scores.

* $p < .05$. ** $p < .01$. *** $p < .001$.

other areas. Neither the family-social nor the employment ISRs were related to their validation measures.

Our study is the first to provide validity evidence, derived from independent measures, for the ASI in a psychiatric sample. Overall, convergent support for validity was obtained for many of the scales, comparable with previous studies (cf. Hendricks et al., 1989; Kosten et al., 1983; McLellan et al., 1985). However, less consistent evidence of discriminant validity was observed. Notably, we did not find support for the validity of the family-social and the employment subscales in this psychiatric sample.

Summary and Recommendations

These findings demonstrate the value of evaluating the psychometric properties of assessment instruments when used with populations other than those for which they were designed. Our study differs from previous psychometric evaluations of the ASI in two important ways: (a) All participants had severe and persistent mental disorders and (b) they were already engaged in psychiatric treatment and were not seeking additional treatment for substance-related problems. We took care to exclude cases in which interviewers expressed doubt on the accuracy

Table 5
Correlation Matrix of Composite Scores With Validation Measures

Measure	Composite score						
	1	2	3	4	5	6	7
1. Alcohol							
MAST	.21	.29	.15	.39*	-.07	.18	-.06
CRS-alcohol	.52**	.33	.03	.07	.05	-.05	.08
2. Drug							
DAST	.25	.59***	.20	.24	.00	.41*	.21
CRS-drug	.10	.76***	.17	.31	.13	.12	.17
3. Employment—SAS worker	-.42	-.36	.41	-.09	-.27	.17	.34
4. Legal							
Probation—parole	.18	.01	.18	.47**	-.01	-.03	.24
Convictions	.32	-.16	-.29	-.03	.05	-.17	-.21
5. Family—SAS total	-.00	-.02	.19	.09	.16	.23	.37
6. Medical							
SOM	.09	.29	-.30	.03	.21	.67***	.27
Chronic medical problems	-.03	.23	-.43**	.06	.02	.38*	.20
7. Psychiatric							
GSI	.10	.34	-.20	.06	.32	.69***	.41*
GAF	.13	-.02	-.21	-.02	-.14	-.34*	-.30

Note. MAST = Michigan Alcoholism Screening Test; CRS = Clinician Rating Scale; DAST = Drug Abuse Screening Test; SAS = Social Adjustment Scale; SOM = Somatization scale from the Symptom Checklist 90—Revised; GSI = Global Severity Index from the Symptom Checklist 90—Revised; GAF = Global Assessment of Functioning from the Structured Clinical Interview for DSM-III-R.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 6
Correlation Matrix of Severity Ratings With Validation Measures

Measure	Interviewer severity rating						
	1	2	3	4	5	6	7
1. Alcohol							
MAST	.45**	.28	.42*	.28	.17	.10	.24
CRS-alcohol	.46**	.35*	-.41*	.18	.13	.07	.25
2. Drug							
DAST	.38*	.63***	.38*	.15	.24	.29	.55**
CRS-drug	.17	.69***	-.11	.27	.03	.11	.51**
3. Employment—SAS worker	.00	-.16	.01	-.49	-.17	.06	.15
4. Legal							
Probation—parole	.05	.09	-.11	.42**	.17	-.06	-.08
Convictions	.25	-.19	.08	.32	.11	-.25	-.05
5. Family—SAS total	.09	.05	.04	-.21	-.06	.20	-.02
6. Medical							
SOM	.11	.13	.49**	-.03	.28	.25	.50**
Chronic medical problems	-.06	.11	.34*	.13	.12	.36*	.32
7. Psychiatric							
GSI	.03	.14	.39*	-.06	.40*	.22	.53**
GAF	.01	-.00	-.30	.12	-.13	-.09	-.19

Note. MAST = Michigan Alcoholism Screening Test; CRS = Clinical Rating Scale; DAST = Drug Abuse Screening Test; SAS = Social Adjustment Scale; SOM = Somatization scale from the Symptom Checklist 90—Revised; GSI = Global Severity Index from the Symptom Checklist 90—Revised; GAF = Global Assessment of Functioning from the Structured Clinical Interview for DSM-III-R.

* $p < .05$. ** $p < .01$. *** $p < .001$.

of the data and suggest that interviewer confidence ratings be considered routinely with this population. This conservative approach appears to be justified, given the psychiatric instability of some of our participants; as a result, however, the mixed psychometric findings reported here may actually overestimate some reliability and validity indices.

Several conclusions, and some recommendations, can be offered. First, the employment ISR appears unreliable across raters, replicating similar findings presented by Hodgins and El-Guebaly (1992); furthermore, the employment ISR is unrelated to its own CS and external validation measures. Consequently the use of the employment subscale in samples of persons with a psychiatric disability is not recommended. Second, the CSs for several remaining subscales (legal, drug, alcohol, family—social) do not reflect homogeneous sets of items, so the validity of these subscales as indices of change over time may be limited. We recommend that investigators report alphas for psychiatric samples because it is possible that samples of individuals with less symptoms and less dysfunction would yield more internally consistent CSs. Third, establishing adequate interrater reliability with psychiatric samples may require more training, monitoring, and supervision than with nonpsychiatric samples. Fourth, further attention should be paid to factors that affect the temporal stability of the ASI scores in psychiatric samples. Finally, although portions of the ASI may be useful for individuals with major mental illnesses, the caveats we have identified require users of the ASI to be informed and aware of its potential limitations. Further psychometric investigations would help to establish the effects of sample variations (e.g., gender, diagnosis, psychiatric severity, interest in treatment for substance abuse) on the psychometric soundness of the ASI.

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