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Predicting DSM-IV dependence diagnoses from Addiction Severity Index composite scores

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Abstract

This study, using data from the Drug Evaluation Network System and a study conducted through the Center for Studies on Addiction of the University of Pennsylvania/Philadelphia Veterans Administration Medical Center, sought to determine the potential of the Addiction Severity Index (ASI) to serve as a screening instrument for *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (DSM-IV) substance dependence. A significant positive correlation was found between ASI composite scores (CSs) and DSM-IV diagnoses of dependence in both the alcohol ($r > .7$) and drug ($r > .5$) domains ($p < .01$). Receiver operating characteristic analyses were run to predict DSM-IV alcohol and drug dependence diagnoses from the respective ASI CSs. Results showed good to strong prediction; ASI CSs identified dependent clients with approximately 85% sensitivity and 80% specificity. We recommend strategies for using ASI CSs as a diagnostic screening instrument in both research and treatment delivery environments.

Keywords: ASI; Drug dependence; Alcohol dependence; DSM-IV

1. Introduction

In the United States, the criteria defined by the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision* (DSM-IV-TR; American Psychiatric Association, 2000) are the gold standard for diagnosing a substance dependence disorder. Most health insurance payers (including Medicare and Medicaid) require clients to meet DSM-IV criteria for a substance dependence disorder to reimburse a substance abuse treatment episode, making dependence diagnoses de facto admissions criteria.

Several structured instruments [e.g., Structured Clinical Interview for DSM-IV (SCID) and Psychiatric Research Interview for Substance and Mental Disorders] incorporate DSM-IV criteria in their interviews to produce reliable and valid diagnoses (First, Spitzer, Gibbon, & Williams, 1995; Hasin et al., 1996). However, because structured diagnostic determinations are difficult and time consuming, there has been a great deal of research on screening instruments designed to detect DSM-IV drug dependence and, particularly, alcohol dependence diagnoses. Several of these screening assessments may be administered quickly and with minimal interviewer training. Such instruments include the Alcohol Use Disorder Identification Test (Saunders, Aasland, Babor, de la Fuente, & Grant, 1993), CAGE (Ewing, 1984), Michigan Alcoholism Screening Test (Pokorny, Miller, & Kaplan, 1972; Selzer, 1971), Rapid Alcohol Problems Screen (RAPS/RAPS4; Cherpitel, 1995, Cherpitel, 2000), and TWEAK (Russell et al., 1994), to name a few. There is an extensive literature showing that these instruments exhibit moderate to high levels of sensitivity and specificity in identifying DSM-IV dependence or abuse disorders (Bisson, Nadeau, & Demers, 1999; Buhler, Kraus,

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Augustin, & Kramer, 2004; Rumpf, Hapke, Meyer, & John, 2002; Selin, 2003). Screening research has also sought to determine appropriate diagnostic cutoff scores for predicting risky behavior and DSM-IV substance use disorders in special populations such as pregnant women (Russell et al., 1994), college students (Kokotailo et al., 2004), and minority samples (Cherpitel & Bazargan, 2003).

Another widely used assessment instrument within the substance abuse field is the Addiction Severity Index (ASI). Although the ASI was not designed as a screening tool, because of its prevalence the field would benefit if it were shown to be related to a formal diagnosis. The ASI is a semistructured multidimensional instrument assessing seven life domains (McLellan et al., 1992; McLellan et al., 1985; McLellan, Luborsky, Woody, & O'Brien, 1980). In contrast to the DSM-IV (which uses dichotomous diagnoses), the ASI gauges problem severity by calculating composite scores (CSs) ranging from 0 (*no problem*) to 1 (*extreme severity*) in each of seven domains, of which alcohol use and drug use are two. The ASI is typically used to assess intake status for individuals entering treatment or baseline status for participants in clinical research (a follow-up version exists to measure change). Because the ASI was not designed to produce a diagnostic determination, its clinical value has been limited in many settings. Indeed, the ASI is mainly viewed by substance abuse counselors and treatment facility directors as a research tool with little clinical significance (McLellan, Carise, & Kleber, 2003). As a result, although frequently cited in research, drug and alcohol CSs are rarely calculated and reviewed to inform diagnostic or treatment care planning decisions in addiction treatment facilities.

Although the predictive validity of ASI summary scores has been documented (Alterman, Bovasso, Cacciola, & McDermott, 2001; Bovasso, Alterman, Cacciola, & Cook, 2001), very little research has been done specifically investigating a predictive relationship between ASI CSs and DSM-IV dependence diagnoses. A search of the literature via PsycInfo and Medline revealed only one study relating ASI alcohol and drug CSs to DSM-IV substance use disorder diagnoses in patients (Lehman, Myers, Dixon, & Johnson, 1996). This study showed encouraging relationships between ASI scores and diagnostic criteria; however, it focused solely on psychiatric inpatients and thus its implications are limited. Similarly, a study focused on prisoners demonstrated that ASI drug and alcohol CSs were effective screens for drug and alcohol dependence, respectively, and compared favorably with other substance use measures in screening for dependence (Peters et al., 2000). This gap in research is unfortunate and leads to the question of whether ASI alcohol and drug CSs could be used to screen individuals in substance abuse treatment as well as research and predict DSM alcohol and drug dependence diagnoses. Addiction researchers and counselors alike would be well served by evidence that threshold scores on ASI drug and alcohol CSs could serve as adequate proxies for diagnostic determinations.

This practical and important clinical question formed the basis for the present exploration of the relationships between ASI drug and alcohol CSs and DSM-IV substance dependence diagnoses. The analyses presented here sought to determine the sensitivity and specificity of various cutoff points on ASI alcohol and drug CSs in predicting DSM-IV substance dependence among clients presenting for addiction treatment. These threshold scores would provide a new clinically useful application for the ASI and might reduce admission assessment time for clients by eliminating a screening or diagnostic instrument. Similarly, the ability to estimate or derive substance dependence diagnoses from the ASI would result in research applicability owing to increased efficiency in data-gathering procedures and an accurate method of estimating the portion of a sample likely to meet diagnostic criteria where no SCID information is available.

Two studies that addressed the relationship between ASI alcohol and drug CSs and DSM-IV dependence diagnoses will be described. The first study was conducted in a large clinical sample; the second, in substance-abusing patients participating in a more formally structured research project. Although results from the first study were promising, we replicated the analyses on a different data set both to address limitations of the initial work and to increase the applicability of our findings.

2. Study 1 (DENS)

2.1. Methods

Initiated in 1997, the Drug Evaluation Network System (DENS) is an electronic data collection and reporting system providing ASI data on patients entering addiction treatment programs (Carise, McLellan, Gifford, & Kleber, 1999). All patients included in the study completed their ASI interview during their intake appointment or early in their course of formal treatment (typically within the first week). In March 2002, an additional module containing DSM-IV alcohol and drug dependence criteria was added to the DENS ASI software permitting a determination of past-year DSM-IV diagnoses as well as recent (past 30 days) severity via the drug and alcohol CSs at baseline (see Section 2.1.2).

2.1.1. Participants

Three thousand four hundred ninety-nine subjects were assessed via the DENS, including the DSM-IV questions, between March 2002 and April 2003. However, 675 of these clients had been in a controlled environment (e.g., jail, hospital) during most of the month before their admission, potentially minimizing the true severity of their recent substance use. Thus, our final sample was composed of 2,824 participants who reported being in a controlled environment (e.g., jail, inpatient treatment) 15 days or less within the past 30 days. Of the sample, 64% were male, 56% were White, and 23% were Black. Participants were an

average of 35 years old (*SD* = 10), and 63% had completed 12 or more years of formal education. Eighty-three percent reported earning $1,000 or less from employment in the past 30 days. Half (50%) of the sample had never been married, and an additional 30% reported being divorced or separated.

Although they are not nationally representative, the participants in this sample were assessed at 41 treatment facilities located all over the United States. Twenty-eight percent were assessed in inpatient facilities, 51% in a traditional outpatient setting, and 15% via methadone maintenance programs. Thirty-one percent of the sample met diagnostic criteria for alcohol dependence, and 47% met the DSM-IV checklist criteria for drug dependence at some point in the past year (18% qualified for both diagnoses). Forty percent of the participants had been treated previously for alcohol abuse (averaging 3.05 treatment episodes in their lifetime; *SD* = 3.37), and 52% had been treated previously for drug abuse (averaging 3.42 episodes; *SD* = 3.43). Twenty-four percent of the sample had been treated previously for both drug and alcohol abuse.

2.1.2. Instruments

The ASI was administered by trained counselors using the DENS software package as part of their standard baseline assessment. The DENS software is essentially identical to the paper-and-pencil ASI. However, an important benefit of using the software is the cross-checking system integrated in the question screens. The cross-checks help ensure the validity of the data collected, guarding against logically inconsistent and out-of-range responses.

The DSM-IV questions for alcohol and drug dependence included within the DENS software were the seven questions with yes-or-no response options to be coded separately for alcohol and other drugs derived directly from the published manual (American Psychiatric Association, 2000) in the form of a checklist. The checklist had seven items of which three endorsements are required to qualify for a diagnosis of dependence. It is important to note that the DENS DSM-IV criteria for drug dependence did not differentiate between nonalcoholic drugs. Thus, it is not possible to determine dependence diagnoses for specific drugs (e.g., cocaine, marijuana). Rather, the items asked about symptoms related to drugs in general over the past year of the client's life.

2.1.3. Interviewers and training

As part of the standard DENS protocol, all counselors received 2 days of training on the ASI and DENS software by experienced ASI trainers. The DSM-IV checklist was reviewed as part of this training, but counselors were not formally trained in making clinical diagnoses.

2.1.4. Data analysis

The CS distribution was skewed toward *no problem*; 40% of records scored 0.00 for alcohol, and 32% scored 0.00 for drugs. To correlate a binary diagnosis with the ordinal CS variable, we used Spearman's ρ correlations to verify the existence of a positive relationship between the ASI CSs and DSM-IV diagnoses. In accordance to DSM-IV conventions, variables were created to reflect a diagnosis of alcohol or drug dependence if a client endorsed three or more items in the respective seven-item scale.

Receiver operating characteristic (ROC) analyses (Metz, 1978) were conducted to generate predictability curves for both the alcohol and drug domains. Initially used in radiology, ROC curves have more recently been used to determine the validity of a diagnostic tool or procedure and have been applied in the past to the ASI as well as other screening instruments for substance use disorders (Calsyn et al., 2004; Clements & Heintz, 2002; Kokotailo et al., 2004; Lehman et al., 1996; Rumpf et al., 2002). The curves are generated by choosing an exhaustive series of test variable (ASI CS) values and calculating the sensitivity and specificity of each when treated as a cutoff score for predicting a *state* variable (in this case, the presence or absence of a DSM-IV substance dependence diagnosis). The curve plots sensitivity (true positives) versus 1-specificity (false alarms) for each potential value of the test variable. A line with a slope of 1 at the origin represents perfect chance or a complete lack of predictive ability (i.e., an equal likelihood of true positives and false alarms). The area under the ROC curve (AUC) for this chance line is equal to 50% of the entire graph. When the AUC (represented by the *C* statistic) reaches 80%, the test variable is said to be a good predictor of the state variable.

2.2. Results

To establish CS cutoffs that achieved an acceptable percentage of true negatives as well as true positives, we sought cutoff points with at least 85% sensitivity and 80% specificity. As this study was devised with the goal of potentially aiding both researchers and substance abuse counselors in treatment facilities, both the empirical and clinical issues surrounding the selection of a specific cutoff point as a threshold are addressed in detail in the Discussion. All statistical calculations in this study were performed using SPSS 11.5. After calculating ROC analyses within the alcohol and drug domains overall, the data were split by sex to determine whether the optimal CS threshold for predicting DSM dependence would vary significantly between these two groups. Insofar as multiple lines of research have found sex differences with regard to patterns, effects, causes, and correlates of alcohol and other drug use, abuse, and/or dependence (Lynch et al., 2002), we considered this an important additional set of analyses (Table 1).

2.2.1. Alcohol

Across the Study 1 (DENS) sample, a strong correlation was found between the ASI alcohol CS and a DSM-IV alcohol dependence diagnosis ($r = .656$; $p < .01$). Separate

Table 1
Study 1 (DENS; N = 2,824)

	n	C (AUC)	95% CI	CS cutoff	Percentage of sensitivity	Percentage of specificity	SE
Alcohol CS versus alcohol dependence							
All	2,813	0.90	0.88–0.91	0.15	86	80	0.01
Male	1,792	0.89	0.88–0.91	0.17	84	80	0.01
Female	1,021	0.91	0.88–0.93	0.13	85	85	0.01
Drug CS versus drug dependence							
All	2,805	0.91	0.90–0.92	0.12	85	86	0.01
Male	1,781	0.91	0.89–0.92	0.11	85	85	0.01
Female	1,024	0.91	0.89–0.93	0.12	85	84	0.01

Note. CI, confidence interval.

correlations for men (r = .643; p < .01) and women (r = .686; p < .01) were each robust as well. There was a significant sex difference between the alcohol correlations, with women showing more robust relationships (z = 1.96; p = .05). Prediction of alcohol dependence using the alcohol CS was quite good in the overall sample, with the AUC value being 0.90 and comparable across sexes. Specifically, the AUC value for men was 0.89 and was 0.91 for women (z = 1.41; p = *ns*). At a CS cutoff value of 0.15, 86% of the patients meeting DSM criteria (via the DENS checklist) for alcohol dependence were accurately identified, along with 80% of those not meeting DSM criteria. Using this cutoff score, 41% of the sample would be predicted as positive for alcohol dependence in comparison with 31% of the sample who actually met criteria for an alcohol dependence diagnosis via the DSM checklist.

It is important to note here that a client at the cutoff represents the minimum ASI severity for a dependence diagnosis, not the prototypic alcohol dependence case. Not surprisingly, as a client's CS increases, so does the probability that he or she will also qualify for a diagnosis of dependence. The above holds true in the drug domain as well.

2.2.2. Drug

A strong and significant correlation was also found between the ASI drug CS and drug dependence (r = .718; p < .01). The correlations for men (r = .708) and women (r = .694) were strong as well and not significantly different from each other (z = 0.70). Prediction of drug dependence using the drug CS was quite good in the overall sample, with C being 0.91. The AUC value was 0.91 within both male and female sex subsets (z = 0.00; p = *ns*). More specifically, 85% of the patients meeting DSM-IV criteria (via the DENS checklist) for drug dependence were accurately identified, along with 86% of those not diagnosed, at an ASI drug CS cutoff value of 0.15. Considered another way, 47% of the sample had a drug CS at or above this cutoff, which equals 47% of the sample meeting criteria for a drug dependence diagnosis as measured by the DSM checklist. Note that these subsets do not overlap 100%.

2.2.3. Rationale for a second study

There are three significant limitations to the data presented above. First, the ASI and DSM data collected in this sample were based on two time frames (past 30 days and past year). Second, since training on the checklist was similar across counselors and admittedly brief, counselor experience in making DSM substance use disorder diagnoses was likely quite variable. Third, the same interviewers gathered both assessments, leading to possible interrater effects in our results. All of the above limitations were addressed in our second study (described in the next section) in which the time frame for the CS information and DSM-IV dependence diagnosis was the past 30 days, all interviewers were of a bachelor's level or higher and extensively trained to administer both the ASI and SCID, and separate interviewers completed each instrument.

3. Study 2 (Penn)

3.1. Methods

The second group of subjects consisted of patients assessed at baseline during a study conducted within the Center for Studies on Addiction of the University of Pennsylvania/Philadelphia Veterans Administration Medical Center (Penn) at facilities within the Philadelphia metropolitan area to evaluate the reliability and validity of various ASI summary scores/measures. In these studies, 605 subjects were assessed between June 1999 and December 2001. The assessment included both the ASI and SCID and was conducted within the first 2 weeks after treatment intake. Although 605 patients participated in the study, only 585 records contained a complete set of responses to both the ASI and SCID (used to determine a dependence diagnosis in this sample). To make the sample as similar as possible to the DENS sample used in the first study, we limited our final sample to 562 participants who reported being in a controlled environment (e.g., jail, inpatient treatment) 15 days or less within the past 30 days.

3.1.1. Participants

Of the sample, 75% were male, 27% were White, and 70% were Black. Participants were an average of 42 years old (SD = 9), and 76% had completed 12 or more years of formal education. Eighty-eight percent reported earning $1,000 or less from employment in the past 30 days.

Thirty-eight percent of the sample had never been married, and an additional 38% reported being divorced or separated.

Participants in this sample were assessed at eight treatment facilities in Philadelphia. Twenty-seven percent were assessed in inpatient facilities, 42% in a traditional outpatient setting, and 29% via methadone maintenance programs. One third (33%) of the sample met diagnostic criteria for alcohol dependence, and 81% met the criteria for drug dependence at some point in the past year (23% qualified for both diagnoses). Forty percent of the participants had been treated previously for alcohol abuse (averaging 5.02 treatment episodes in their lifetime; *SD* = 8.23), and 79% had been treated previously for drug abuse (averaging 5.65 episodes; *SD* = 7.59). Slightly fewer than one third of the sample (31%) had been treated previously for both drug and alcohol abuse.

3.1.2. Instruments

The ASI (described in Section 2.1.2) used in this study was administered by trained and well-supervised research interviewers using a standard interview in paper-and-pencil format. The SCID-I Version 2.0 was used to gather DSM-IV dependence criteria (First et al., 1995). It is a structured interview used for making the major DSM-IV substance use diagnoses. The instrument probes clients about symptoms related to their alcohol or drug use and indicates a diagnosis of dependence if the clients endorsed three of seven specific criteria (identical to those assessed on the DENS DSM checklist). The SCID differs from the DENS DSM checklist used in the first study in two significant ways. First, the SCID provides dependence diagnoses over both a patient's lifetime and the past 30 days. To keep the instrument consistent with the ASI CS, we used the current (past 30 days) diagnosis for this study. Second, unlike the DENS checklist for drug disorders, the SCID differentiates between nonalcoholic substances and thus produces substance-specific diagnoses, which were consolidated for comparability with Study 1 (see below). The SCID is a widely used diagnostic interview with demonstrated reliability and validity (Kranzler, Kadden, Babor, Tennen, & Rounsaville, 1996; Williams et al., 1992; Zanarini et al., 2000).

3.1.3. Interviewers and training

Interviewers in this study had at least a bachelor's degree (although most held a master's degree) and were formally trained in the administration of both the ASI and the SCID. Each instrument was collected by separate interviewers for each client to guard against shared rater bias.

3.1.4. Data analysis

To make the analyses as similar as possible to those in the first study, we created a drug dependence (excluding alcohol) variable for which a *yes* was coded if clients endorsed items indicating that they were currently (past 30 days) dependent on at least one drug listed in the SCID. A *no* response was coded for this variable by default if patients reported no use of any drug either in their lifetime or in the past 30 days. In keeping with the administration conventions for the SCID, clients were only asked about dependence if they had already met criteria for a diagnosis of abuse for a particular drug. Therefore, a *no* response was the default coding for dependence if clients did not meet the criteria for abuse of any drug.

As was the case with Study 1, the CS data in this study were skewed (although less so). Thirty-two percent of subjects scored 0.00 in the alcohol domain, whereas 10% scored 0.00 in the drug domain. As with the DENS sample, we ran Spearman's ρ correlations and performed the same series of ROC analyses (both overall and within sex subsets).

3.2. Results

3.2.1. Alcohol

Across Sample 2, a strong correlation was again found between the ASI alcohol CS and alcohol dependence ($r = .710$; $p < .01$). The correlations for men ($r = .701$) and women ($r = .736$) were strong as well and not significantly different from each other ($z = 0.69$). Prediction of alcohol dependence using the alcohol CS was quite good in the overall sample, with the AUC value being 0.92 and comparable across sexes. Specifically, the AUC value for men was 0.91 and was 0.93 for women ($z = 0.71$; $p = ns$). Using an ASI alcohol CS cutoff value of 0.12, 85% of the patients meeting DSM-IV criteria (via the SCID) for alcohol dependence were accurately identified, along with 80% accurately identified as lacking a diagnosis. Looked at another way, 40% of the sample had an alcohol CS at or above this cutoff as compared with 33% of the sample with an actual alcohol dependence diagnosis. It is important to note the minimal difference between the two studies' optimal threshold scores for alcohol dependence (Table 2).

3.2.2. Drug

A moderate correlation was found in this sample between the ASI drug CS and drug dependence ($r = .512$; $p < .01$). The correlations for men ($r = .548$) and women ($r = .388$) were moderate as well. Drug CS in the male subset was significantly better related to dependence than that in the female subset ($z = 2.08$; $p < .05$). Prediction of drug dependence using the drug CS was good in the overall sample, with the AUC value being 0.88 and comparable across sexes. Specifically, the AUC value for men was 0.89 and was 0.81 for women ($z = 0.00$; $p = ns$). Using an ASI drug CS cutoff value of 0.16, 84% of the patients meeting DSM-IV criteria (via the SCID) for drug dependence were accurately identified, along with 81% of those not meeting diagnostic criteria. Considered another way, 71% of the sample had a drug CS at or above this cutoff as compared with 88% of the sample with an actual drug dependence diagnosis. As in the alcohol domain, there is minimal difference between the two studies' optimal threshold scores for drug dependence (Table 2).

Table 2
Study 2 (Penn; $N = 562$)

	n	*C* (AUC)	95% CI	CS cutoff	Percentage of sensitivity	Percentage of specificity	*SE*
Alcohol CS versus alcohol dependence							
All	496	0.92	0.89–0.94	0.17	85	80	0.01
Male	375	0.91	0.88–0.94	0.19	87	81	0.02
Female	121	0.93	0.89–0.97	0.13	91	81	0.02
Drug CS versus drug dependence							
All	562	0.88	0.83–0.92	0.16	84	81	0.02
Male	424	0.89	0.85–0.93	0.16	85	82	0.02
Female	138	0.81	0.68–0.94	0.18	77	81	0.07

3.3. Comparing ROC results between the DENS and Penn studies

Using a standard formula, we calculated the standard error of the difference in AUC for alcohol and drug results in both samples. Using these values, we then computed *z* statistics for the alcohol and drug domains to determine if a statistically significant difference existed between ROC curves generated from the two samples. In both the alcohol and drug domains, the difference tests ($z = 1.41$ for alcohol; $z = 1.34$ for drug) were well below the commonly accepted critical level of 1.96 (the point at which the two areas are considered significantly different). These results show the two samples to be statistically comparable in terms of ROC results but do not take into account the shape of the curves (a potential contributor to levels of sensitivity and specificity at any given cutoff point).

4. Discussion

We sought CS cutoffs achieving 85% sensitivity and 80% specificity with regard to identifying DSM-IV substance dependence diagnoses. In a clinical setting missing, 15% of patients who meet the criteria for a dependence diagnosis might be deemed undesirable. Sensitivity and specificity, however, are inversely related and moving higher or lower on the ROC curve with regard to either measure resulted in unacceptable shifts in the other. To maximize the value of the ASI as a screening tool for DSM-IV diagnoses, we also examined CS cutoff scores providing 90% sensitivity, but in virtually all cases specificity dropped below 80% and in some cases well below 70%. Therefore, the target of 85% sensitivity and 80% specificity that we adopted throughout both studies proved, in our opinion, to be the best combination.

The results demonstrate that ASI alcohol and drug CSs are strongly related to diagnostic determinations in two independent samples and were able to accurately predict DSM-IV diagnoses within these clinical populations. ROC analyses overall and within sex subsets showed good prediction and were statistically similar in the two clinical samples. This was achieved despite some noteworthy demographic differences in those samples and clear methodological differences in the way the diagnoses were determined. The first study included counselors from 41 programs in real world treatment settings. Diagnostic determinations were made by these counselors using a DSM-IV checklist, in contrast to what is typically done in contemporary settings of care. Although there are legitimate questions regarding the precision of these diagnoses under these conditions, this study provides a determination under real world conditions (in which the findings might actually be used in a treatment setting). The second study was not done under normal clinical conditions but was a very carefully supervised examination of diagnoses in a clinical research paradigm. Here, those making the diagnoses were well-trained and well-supervised research technicians using a structured diagnostic interview (SCID). That the findings were so similar despite these differences provides some measure of confidence in recommending potential implementation strategies.

Owing to the markedly greater degree of scientific rigor under which the data for Study 2 were gathered, we recommend the ROC cutoffs resulting from those data be considered the standard with which the results from Study 1 (and future work) be compared. In addition, as the numeric difference in optimal CS thresholds between sexes is negligible with regard to representing a clinically relevant variation in responses to ASI items, we recommend using the threshold resulting from ROC analyses run across the overall Study 2 data set (alcohol CS = 0.17; drug CS = 0.16) to predict DSM-IV dependence in other similar populations.

Statistically justifiable ASI CS cutoff scores for DSM-IV dependence offer a practical contribution to the addiction research field. For investigators already collecting the ASI (which gathers data in five areas apart from substance abuse), these results may enhance the value of the existing ASI assessment to their study's findings by providing the ability to align the alcohol and drug use results with diagnoses and assuaging the need for a timely (and thus costly) structured diagnosis. For example, in epidemiological research, the ASI CS values could lead one to reasonably approximate the percentage of respondents with a current alcohol or drug dependence diagnosis in the sample.

From an administrative perspective at the treatment program level, it is important to note that these findings should not be read as a recommendation that counselors rely solely on the ASI to make diagnostic decisions. Many programs and patients identify the primary substance of abuse before a formal assessment. Thus, a treatment facility

might use the ASI as a screener for alcohol problems in patients who are primarily drug abusers and for drug problems in patients whose primary substance of abuse is alcohol. Therefore, although the ASI should not be used independently to form a diagnosis, it is a potentially useful screen for other substance use problems in clients whose primary substance of abuse has already been established. Furthermore, a treatment provider without the resources to conduct a structured clinical interview during his or her assessment might use the ASI CS as supporting evidence to inform payers that patients scoring above the designated thresholds will likely also meet contemporary diagnostic criteria for substance dependence.

In terms of applicability in the treatment field (a significant concern of our group), although the trend is toward implementing software-assisted ASI interviews (e.g., DENS, ASI-MV, statewide data-entry systems), most counselors currently conducting ASIs in the field do so with a paper form rather than a computerized version. Although these counselors do not have access to automatically calculated CSs, a simple spreadsheet for calculating CSs is available free of charge online (http://www.tresearch.org/resources/instruments.htm). As this spreadsheet takes far less time to complete than a diagnostic instrument, it may be a viable option for those facilities using paper ASI forms wishing to make clinical use of CSs.

4.1. Limitations and future work

The limitations of Study 1 are discussed in Section 2.1.3 and were the central motivation for replicating our analyses on a more rigorously collected data set. The main limitation of Study 2 results is the high base rate of DSM drug dependence. With 81% of clients qualifying for dependence in this highly impaired population, the number of non-drug-dependent clients was only 110. Given this limitation, the identification of drug dependence in Study 2 was still acceptable. Nonetheless, further work with strong results from a less uniformly drug-dependent population would lend more confidence regarding the usefulness of the CS in predicting drug dependence.

Future research might attempt to validate the chosen CS cutoff scores in a larger sample, particularly one containing both SCID and ASI drug data (as opposed to only alcohol). With such a sample, the ability to identify and differentiate specific drug dependence diagnoses beyond general drug dependence would further support the current work and extend its value to both clinicians and researchers.

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