Performance of the CJDATS *Co-Occurring Disorders Screening Instruments* (CODSIs) among Minority Offenders

Alexandra Duncan, M.P.H.[*], **Stanley Sacks, Ph.D.**[†], **Gerald Melnick, Ph.D.**[†], **Charles M. Cleland, Ph.D.**[†], **Frank S. Pearson, Ph.D.**[†], and **Carrie Coen, M.A.**[†]

[†]Center for the Integranon of Research & Practice (CIRP), National Development & Research Institutes, Inc. (NDRI), New York

Abstract

Previous research has shown the performance of the CJDATS *Co'-Occurring Disorders Screening Instruments* (CODSI-MD and SMD)—six- and three-item instruments to screen for any mental disorder (CODSI-MD) and for severe mental disorders (CODSI-SMD), respectively—to be comparable or superior to other, longer instruments. This study tested the stability of the performance of the CODSI-MD and SMD across three racial/ethnic groups of offenders entering prison substance abuse treatment programs (*n* = 353), consisting of 96 African American, 120 Latino, and 137 White admissions. The *Structured Clinical Interview* (SCID) was used to obtain DSM-IV Axis I and II diagnoses; a lifetime SCID diagnosis of a mental disorder or a severe mental disorder was the criterion against which the CODSI-MD and SMD were validated. Results showed no statistical differences in sensitivity or specificity for either the CODSI-MD or SMD across the African American, Latino, and White prisoner groups. The value of the CODSI-MD and SMD as brief screens for mental disorders among offenders with diverse racial/ethnic backgrounds is discussed.

INTRODUCTION

Most mental and substance use disorder screening instruments in use today have been developed for use in community-based programs and have not been validated in the criminal justice system. Several standardized instruments are being used in the criminal justice system to screen for mental disorders (*Referral Decision Scale*, Teplin & Swartz, 1989; *Brief Jail Mental Health Screen*, Steadman, Scott, Osher, Agnese, & Clark Robbins, 2005) and for substance use disorders (*Texas Christian University Drug Screen* (TCUDS), Knight & Simpson, 2006; *Alcohol Dependence Scale* (ADS), Horn,Skinner, Wanberg, Foster, & the Alcoholism & Drug Addiction Research Foundation, 1984). However, data on the performance of instruments that screen for co-occurring disorders in criminal justice settings across race/ethnicity are lacking, and a co-occurring disorder screening instrument for use among racial/ethnic minorities in the criminal justice system is needed.

The supplemental study reported here was undertaken to augment the data obtained from African American and Latino offenders in the core study, which had been designed to develop and validate a brief, cost effective alternative to screen offender populations for mental disorders that would, when appended to an existing substance use disorder screener, constitute a combined instrument to screen for co-occurring disorders. The purpose of the

[*]Correspondence to: Alexandra Duncan, M.P.H., Investigator, Center for the Integration of Research & Practice (CIRP), National Development & Research Institutes, Inc. (NDRI), 71 West 23rd Street, 8th Floor, New York, NY 10010, U.S.A. ad2265@colurnbia.edu.

Supplemental study was to examine the performance of the *Co-Occurring Disorders Screening Instrument* for any *Mental Disorder* (CODSI-MD) and the *Co-Occurring Disorder Screening Instrument* for *Severe Mental Disorder* (CODSI-SMD) among African American, Latino, and White offenders.[1]

Sacks and colleagues (2007a) developed two tools to screen for mental disorders that were validated (along with their cut-points) in a subgroup of offenders enrolled in prison substance abuse treatment programs (Sacks et al., 2007b). These two short instruments, the six-item CODSI-MD and the three-item CODSI-SMD (for schizophrenia, major depressive disorders, bi-polar disorders, and suicide risk), were compared with the three standardized instruments—the *MINI Modified Screen* (MMS; Brandau, Alexander, & Haugland, 2005), the *Mental Health Screening Form* (MHSF; Carroll & McGinley, 2001), and the Global Appraisal of Individual Needs Short Screener (GSS Version 1.0; Dennis, Chan, & Funk, 2006); items on the CODSI-MD and SMD were drawn from the MHSF, MMS, and GSS. Results showed that, in addition to being extremely brief, the CODSI-MD and SMD each produced sensitivity and specificity comparable to those of the other instruments (Sacks et al., 2007a, 2007b). The authors concluded that the CODSI-MD and SMD showed sufficient value to justify their use in a criminal justice setting and to warrant validation testing among minorities and those in other criminal justice settings. In view of the disproportionate number of African Americans and Latinos involved in the criminal justice system and the mental illness and substance use histories of offenders (Beck & Karberg, 2001; Harrison & Karberg, 2004; Mumola, 1999), an examination of the performance of a brief, validated instrument for co-occurring mental and substance use disorders among racial/ethnic minorities would be of use to the criminal justice system.

Rates of Minority Incarceration

The U.S. population is comprised of 12.3% persons of African descent and 12.5% persons of Latino or Hispanic heritage (U.S. Census, 2000). When considering incarcerated populations, 46.2% of state and federal prison inmates and 41.3% of inmates in jails are persons of African descent (Beck & Karberg, 2001; Harrison & Karberg, 2004), while 16.4% of state and federal prison inmates and 15.1% of jail inmates have Hispanic origins (Beck & Karberg, 2001; Harrison & Karberg, 2004). African Americans and Latinos who are between 20 and 30 years of age have higher incarceration rates (12.8 and 3.7%, respectively) than their White counterparts (1.6%) (Harrison & Karberg, 2004). In 2002, African American women, despite having lower incarceration rates than African American men, were still more than twice as likely as Latinas, and five times more likely than White women, to be incarcerated (Harrison & Karberg, 2004).

Rates of Substance Use in Offender Populations

The relationship between substance use and crime has been well established in the literature, with offenders reporting high rates of substance use at the time of committing a criminal offense and of criminal activities directly related to substance use, i.e. to obtain money to buy drugs (James & Glaze, 2006; Mumola, 1999). Furthermore, data show that substance use rates among offenders (either the use of alcohol or drugs or both), while increasing steadily in the 1990s (Mumola, 1999), have not changed appreciably in recent years (Mumola & Karberg, 2006). In 1997, 57% of state offenders used drugs in the month prior to the offense, an increase of 7% from 1991. Between 1991 and 1997, increases were also

observed for use of drugs, alcohol and drugs, or alcohol at the time of offense (Mumola, 1999); however, no changes in offender substance use in the month prior to the offense or at the time of offense were observed between 1997 and 2004 (Mumola & Karberg, 2006).

Rates of alcohol and substance use among offenders by race/ethnicity do not differ dramatically. Mumola (1999) reports that, among state offenders, 83.7% of Blacks, 83.6% of Whites, and 80.7% of Hispanics report ever having used drugs. Similarly, Mumola (1999) found few differences by race/ethnicity in drug use at the time of offence (i.e. Whites 33.9%, Hispanics 33.0%, and Blacks 31.9%), with no changes in offender substance use by race/ethnicity observed from 1997 to 2004 (Mumola & Karberg, 2006). White offenders reported the highest percentage of having been under the influence of alcohol at the time of offense (42.7%) followed by Hispanics (36.7%) and Blacks (33.0%) (Mumola, 1999). With such high rates of drug and alcohol use among this population overall, the importance of providing substance-using offenders with needed treatment cannot be overstated.

Rates of Mental Disorder in Offender Populations

It is well documented that rates of mental illness are higher among offenders than in the general population (Fazel & Danish, 2002; James & Glaze, 2006). Recent data from the Bureau of Justice Statistics show that mental health problems (clinical diagnosis or history of treatment by a mental health professional) are found in 56% of offenders in state prisons, 45% of those in federal facilities, and 64% of those in local jails (James & Glaze, 2006). Among prison and jail inmates, 62.2% of whites, 54.7% of Blacks, and 46.3% of Hispanics have had a recent (past 12 months) clinical mental disorder diagnosis or have been treated by a mental health professional (James & Glaze, 2006). With such high rates of mental problems among offenders, screening to identify those with mental disorders is crucial to providing needed treatment. It is especially important to identify and treat minorities, given the disproportionate number of people of color who are incarcerated.

Rates of Co-occurring Disorders in Offender Populations

The rate of co-occurring disorders[2] among offenders is high and continues to increase (Cote & Hodgins, 1990; Sacks & Pearson, 2003). James & Glaze (2006) report that, of state offenders with mental health problems, 74.1 % have an alcohol or drug problem (dependence or abuse), compared to 55.6% of offenders without psychological problems. Offenders with mental disorders have higher rates of alcohol and drug use, drug use, and alcohol use in the month before the offence, at the time of offence, and over their lifetimes compared with offenders without mental disorders James & Glaze, 2006). Furthermore, data on offenders in substance abuse treatment show a high proportion of psychiatric disorders—50 to 75% have a co-occurring mental disorder (Lurigio & Swartz, 2000; Swartz & Lurigio, 2006).

Treatment Outcomes

Studies in community samples (Drake et al., 1998a; U.S. Department of Health and Human Services, 1999) have documented poorer outcomes for clients who have co-occurring disorders, expressed as higher rates of HIV infection, drug relapse, re-hospitalization, depression, and risk of suicide compared with those with a single substance use or mental disorder. Recent reviews have cited a variety of effective treatment strategies and models for co-occurring disorders (Center for Substance Abuse Treatment, 2005; Drake, O'Neal, & Wallach, 2008). In one example of direct relevance to criminal justice populations, Sacks

---

[2]Historically often referred to as "mental illness and chemical abuse" or "MICA" disorders, "cooccurring disorders" has become the preferred term.

and colleagues (2003) described the use of the Modified Therapeutic Community (MTC) model (both in prison and post-release) for male offenders showing evidence of co-occurring disorders. Significant reductions in reincarceration rates (Sacks, Sacks, McKendrick, Banks & Stommel, 2004) and substance use (Sullivan, McKendrick, Sacks, & Banks, 2007) were observed for male offenders with severe co-occurring disorders randomly assigned to MTC treatment compared with their counterparts who had been assigned to standard mental health and substance abuse treatment. In a review of studies conducted within mental health centers, Drake, Mercer-McFadden, Mueser, McHugo, and Bond (1998b) showed that comprehensive integrated treatment was effective in reducing substance use and hospitalizations and improving outcomes. Other studies have demonstrated that integrating mental health treatment in substance abuse treatment settings improves treatment retention (Charney, Paraherakis, & Gill, 2001; McLellan, Arndt, Metzger, Woody, & O'Brian, 1993; Saxon & Calsyn, 1995; Weisner, Mertens, Parthasarathy, Moore, & Lu, 2001). Methods for the treatment of co-occurring disorders, such as 12-step programs and intensive case management, have also been effective (Bartels, Drake, & Wallach, 1995). These studies indicate that, once identified, treatment for co-occurring disorders can be highly effective, improving a variety of outcomes and underscoring the importance of screening offenders for the presence of co-occurring disorders.

METHODS

Sample

The sample for the analyses reported in this article included subjects from both the core and supplemental studies, and contained 353 consecutive new admissions to prison substance abuse treatment programs; a "new admission" was defined as an offender who entered substance abuse treatment no more than 14 days prior to agreeing to participate in the study. The sample of 353 offenders (262 from the core study plus 91 from the supplemental study) included 137 Whites (all from the core study), 96 African Americans (50 from the core study plus 46 from the supplemental study), and 120 Latinos (75 from the core study plus 45 from the supplemental study). This overall sample size is similar to that of other studies comparing sensitivity and specificiry within subgroups (Alexander, Haugland, Lin, Bertollo, & McCony, 2007; Castel, Rush, & Scalco, 2007).

The core study sample was accumulated from four CJDATS Research Centers WDRI Rocky Mountain, Lifespan-Brown University, University of California at Los Angles, and Texas Christian University). In all, 280 subjects were recruited to the core study, including 18 offenders of other racial/ethnic backgrounds; the latter subgroup was omitted for the purposes of these analyses, resulting in an available core study sample of 262 offenders.

The supplemental study, recruited by the NDRI Rocky Mountain Research Center, included a total of 120 minority offenders, all of whom were consecutive new admissions to prison substance abuse treatment in the Colorado Department of Corrections. Data from 21 of these offenders were incomplete due to a facility move, failure to meet all eligibility criteria, or barriers to communication, and were omitted from the analyses; another eight of the recruited offenders declined to participate (a refusal rate of 7%), citing lack of interest in the research or lack of time. The 91 offenders who remained (46 African Americans and 45 Latinos) formed the supplemental sample, which, when combined with the core study sample, constituted a sample statistically sufficient to analyze by race/ethnicity.

Prior to the participants' inclusion in the study, a research interviewer reviewed an informed consent form with each eligible offender, ensuring that all aspects of his/her participation in the study were understood. The consent process informed offenders that their participation

was strictly voluntary and would not affect their treatment, the services they received, or their parole status. The *Institutional Review Boards* of the contributing Research Centers approved and monitored the core study; *Institutional Review Board* of the NDRI Rocky Mountain Research Center reviewed and monitored the supplemental study. The *Office for Human Research Protections* approved the core and supplemental studies, and a *Certificate of Confidentiality* was obtained to cover all participants in both studies.

Research Instruments

The supplemental study used the same instruments and procedures as the core study. A modified version of the CJDATS *Intake Interview* (CJDATS, 2005) was used to collect demographic information such as age, education, employment and criminal histories, and health and psychological status. The screening battery consisted of three standardized instruments—the MHSF (18 items), the MMS (22 items), and the GSS Version 1.0 (15 items)—items on the newly created CODSI-MD and SMD, all with "yes/no" response options, were derived from the MHSF, MMS, and GSS (MHSF, Carroll & McGinley, 2001; MMS, Brandau et al., 2005; GSS Version 1.0, Dennis et al., 2006). The selection of instruments included in the CODSI screening battery relied on a review of the literature, stakeholder recommendations, and pilot test results. (See Sacks et al., 2007a, for additional information regarding the selection requirements of instruments for the screening battery.)

As noted, the NDRI research team developed the six-item screen for any mental disorder (CODSI-MD) and the three-item screen for severe mental disorders (CODSI-SMD) using items drawn from the MMS, MHSF, and GSS (see Sacks et al., 2007a, for a complete description of the development of the CODSI-MD and CODSI-SMD). The SCID (First, Spitzer, Gibbon, & Williams, 2002) is considered to be a standard for diagnosing substance use and mental disorders (Baldassano, 2005; Blackburn, 2000; Maffei, Fossati, Agostonid, Barraco, & Bagnato, 1997; Magruder, Sonne, Brady, Quello, & Martin, 2005; Ramirez Basco et al., 2001) and was used as the criterion measure. The SCID provides Axis I and II diagnoses using 30-day and lifetime information; lifetime SCID diagnoses were the criterion against which the CODSI instruments were validated. Items on the CODSI-MD and CODSI-SMD include response time frames of lifetime, past 12 months, and past two years. Lifetime diagnoses are reflected on five of six items on the CODSI-MD and on two of three items on the CODSI-SMD, resulting in parallel lifetime to lifetime relationships for seven of nine CODSI items.

Test Administration

The supplemental and core studies followed identical methodological procedures. The investigator for the supplemental study administered the CJDATS *Intake Interview* to participants, followed by the screening battery, which consisted of the three mental disorder screening instruments (MHSF, MMS, GSS) given in random order. The CODSI-MD and SMD were not administered separately; items on the CODSI-MD and SMD are included in the MHSF, MMS, or GSS, and were administered as part of the randomly ordered screening battery. Within one month of the completion of the *Intake Interview* and screening battery, a trained SCID interviewer administered the SCID to all participants; a SCID supervisor reviewed all SCID interviews for completeness and accuracy. The SCID interviewers had no knowledge of the results of the *Intake Interview* or of the screening battery to prevent interviewer bias from affecting the SCID diagnosis.

Cut-off Scores

Cut-off scores, or cut-points, are used to identify those individuals who have a potential mental health disorder that warrants further assessment; scores above the cut-point indicate the presence of a mental disorder, and scores below the cut-point indicate no disorder. The

supplemental study used the cut-points that had been established and validated in the core study (Sacks et al., 2007a, 2007b), and that produced an optimal combination of sensitivity, specificity, and overall accuracy for each instrument. When the overall accuracy was identical for two cut-points, the cut-point with the highest sensitivity was selected. (See Sacks et al., 2007b, for the validation of the cut-points for each instrument.)

Analytic Strategy

Cansistent with previous validation studies of the CODSI-MD and SMD (Sacks et al., 2007a, 2007b), this report concentrates, primarily, on the sensitivity and specificity scores. *Sensitivity* is the percentage of individuals with the condition whom the screener correctly identified as having the condition; this is also known as the true positive rate. *Specificity* is the percentage of individuals who do not have the condition and that the screener correctly identified as being free of the condition; this is also known as the true negative rate. Sensitivity and specificity are best suited to the needs of prison and program administrators, being easily interpreted and providing information about (1) the percentage of individuals who truly have the condition and will be detected by the CODSI-MD or CODSI-SMD (sensitivity), important for determining who needs further assessment; and (2) the percentage of individuals who truly do not have the condition and will be ruled out by the CODSI-MD or CODSI-SMD (specificity), important for excluding those who do not warrant further assessment. Moreover, sensitivity and specificity are determined from separate subsamples, composed of individuals with (prevalence 100%) and without (prevalence 0%) the disorder, and are not dependent on the prevalence of the disorder in the population of interest. This quality makes sensitivity and specificity suitable for examining the performance of screening instruments across populations in which prevalence could vary.

The Pearson chi-square was used to test the significance of differences among the raciallethnic groups on sensitivity, specificity, and demographic characteristics. Testing for differences in sensitivity and specificity among raciallethnic groups involves the cross-tabulation of racelethnicity with the screening result in a subgroup of the total sample. The cross-tabulation and associated Pearson chi-square test among those with the condition constituted a comparison of sensitivity; among those without the condition, the cross-tabulation and associated Pearson chi-square test constituted a comparison of specificity. The sensitivity and specificity comparisons were independent because different subgroups were assessed, hence the use of the Pearson chi-square statistic was warranted. The data were weighted by racelethnicity and gender to account for the over-sampling of female offenders. Confidence limits (95%) for all performance measures have been included to indicate the precision of estimates.

Additional Analyses—Although the measures just discussed were sufficient to achieve the primary aim of this study, the analyses included other measures of the psychometric properties of these instruments; i.e. *overall accuracy*, which is the percentage of all individuals who are properly identified by the screener as either having or not having the condition. Another set of measures describes those who did and did not receive a positive screen; *positive predictive value* (PPV) represents the percentage of individuals with a positive screen who actually had the condition, while *negative predictive value* (NPV) represents the percentage of individuals with a negative screen who did not have the condition. A third set of measures consists of *likelihood ratios* that reflect changes in the odds, using the screening instrument result, that a particular individual either had (i.e. a positive likelihood ratio or LR+) or did not have (i.e. a *negative likelihood ratio*, or LR–) the condition.

RESULTS

Table 1 shows the self-reported demographic characteristics of the study sample composed of African Americans and Latinos from the core and supplemental studies, and Whites from the core study. The majority of the sample in each racial and ethnic group was male. The average age was 36 years for African Americans, 33 years for Latinos, and 36 years for Whites. Significant differences between the racial/ethnic groups were evident for the mean number of children under 18 years old, with Latinos reporting more children than African Americans or Whites ($p < 0.05$). Whites showed more signs of mental disorder as evinced by higher percentages of lifetime hospitalizations for psychiatric or emotional problems ($p < 0.01$), lifetime major depressive disorder ($p < 0.01$), and a SCID diagnosis of severe mental disorder ($p < 0.05$). Whites also had more severe substance use problems, represented by the percentage reporting lifetime injection drug use ($p < 0.001$), lifetime heroin use ($p < 0.01$), lifetime cocaine use ($p < 0.001$), and lifetime methamphetamine use ($p < 0.001$).

Sensitivity and Specificity

Sensitivity—Table 2 shows the sensitivity scores for the CODSI-MD (any mental disorder) and the CODSI-SMD (severe mental disorders) by race/ethnicity after weighting the data to offset the over-sampling of females. The CODSI-MD scores showed no significant differences between the groups when screening for any mental disorder, with the considerable overlap between confidence limits (presented in parentheses) indicating little difference in sensitivity between the groups. The data for the CODSI-SMD showed similar results, with no statistically significant differences in sensitivity between the groups when screening for a severe mental disorder, and considerable overlap between the groups in the confidence limits.

Specificity—Table 3 shows the specificity of the instruments after weighting for the over-sampling of females. No significant differences were apparent for either instrument, and confidence limits for both instruments showed considerable between group overlap.

Additional Criteria for Consistency Across Race/Ethnic Groups

Table 4 displays the relative performance of the CODSI-MD and CODSI-SMD using additional measures. The performance of the CODSI-MD was consistent across the racial/ethnic groups. The *negative likelihood ratio*, which involves the odds of not having the condition, had the largest differences between the groups, but even these differences (0.42 for African Americans and 0.30 for Latinos and Whites) were relatively small, with considerable between group overlap in the confidence limits. Comparisons for the CODSI-SMD (severe mental disorders) exhibited substantial differences in the point estimates of *positive predictive values* and *positive likelihood ratios* across racial/ethnic groups. These differences indicated greater accuracy for Whites; however, given the precision of these values (a function of the number of cases available), the confidence intervals overlap substantially.

Clinical efficiency

Table 5 shows the clinical efficiency of the CODSI-MD and SMD in the unweighted data. The CODSI-MD and SMD were both clinically efficient in terms of conserving assessment resources, identifying for further assessment those individuals who actually had a mental disorder and few of those who did not have a disorder. The CODSI-MD identified 65 African American offenders as having a mental disorder, 51 (78.5%) of whom had a corresponding SCID diagnosis for any mental disorder. Among Latinos, the CODSI-MD identified 83 offenders as having a mental disorder, 72 (86.7%) of whom had a corresponding SCID diagnosis of a mental disorder. Among White offenders, the CODSI-

MD identified 99 offenders as having a mental disorder, 83 (83.8%) of whom had a corresponding SCID mental disorder diagnosis.

The CODSI-SMD was also efficient. Among African American offenders, the CODSI-SMD identified 29 individuals as having a severe mental disorder, 17 (58.6%) of whom met the SCID criteria for a severe mental disorder, while 9 of the remaining 12 individuals met the SCID criteria for a mental disorder that was not severe; in other words, 26 of the 29 (89.7%) individuals the CODSI-SMD identified as having a severe mental disorder met SCID criteria for some type of mental disorder. Among Latinos, the CODSI-SMD identified 33 individuals as having a severe mental disorder, 18 (54.5%) of whom met the SCID criteria for a severe mental disorder, while 14 of the remaining 15 met the criteria for any mental disorder. Thus, of the 33 Latinos the CODSI-SMD identified as having a severe mental disorder, 32 (97.0%) met SCID criteria for a mental-disorder diagnosis of some type. Among Whites, the CODSI-SMD identified 42 individuals as having a severe mental disorder, 35 (83.3%) of whom met the corresponding SCID criteria for a severe mental disorder, while 5 of the remaining 7 met the criteria for any mental disorder. Thus, of the 42 Whites the CODSI-SMD identified as having a severe mental disorder, 40 (95.2%) met SCID criteria for a severe or non-severe mental disorder.

DISCUSSION

The study reported here demonstrated the consistency of sensitivity and specificity scores across raciallethnic groups of African American, Latino, and White prisoners entering prison substance abuse treatment programs, which extends prior research (Sacks et al., 2007a, 2007b) that validated the CODSI-MD as a screening instrument for *any* mental disorder and the CODSI-SMD as a screening instrument for *severe* mental disorders among substance-abusing prisoners. Although the main focus of this supplementary study was on sensitivity and specificity, other measures typically used to determine the performance of screening instruments were considered. These additional measures (i.e. negative likelihood ratio, positive predictive value, positive likelihood ratio) also showed no differences between the raciallethnic groups for either the CODSI-MD or the CODSI-SMD, given the precision of these values as indicated by the overlapping confidence limits. Thus, the CODSI-MD and SMD were shown to produce equivalent accuracy across all three of the major racial1 ethnic groups.

The absolute values of sensitivity and specificity scores of the CODSI, containing few items, compared favorably with other screening instruments that Sacks and colleagues tested (Sacks et al., 2007a, 2007b). In general, the CODSI-MD produced acceptable sensitivity and specificity. Furthermore, the sensitivity was somewhat higher than the specificity, which indicates more efficiency in the identification of individuals with a mental disorder than in the identification of those without a mental disorder; given the high lifetime prevalence of mental disorders (over 70%) in the populations tested, the emphasis on identifying individuals with the disorder is appropriate. The CODSI-SMD (for severe mental disorders) also produced acceptable sensitivity and specificity, with the specificity being considerably higher than the sensitivity. This is an appropriate balance for the populations tested, because the lifetime prevalence for severe mental disorders drops to less than 30%; at this prevalence, the emphasis shifts to excluding individuals who do not have the disorder, as there are many more offenders without a severe mental disorder.

In addition to demonstrating good psychometric properties on the primary measures of sensitivity and specificity, it is notable that both the CODSI-MD and SMD meet acceptable standards for clinical efficiency, expressed as the percent of individuals referred to assessment who actually have the condition. Efficiency gains importance when assessment

resources are scarce, optimizing the number of individuals in need of services who actually receive those services, and minimizing the assessment resources that are spent on individuals who do not have the condition. In this instance, of the individuals with positive scores on the CODSI-MD (for any mental disorder), 84% of African Americans, 87% of Latinos, and 85% of Whites had a corresponding SCID diagnosis of a mental disorder, showing that the instrument is similarly efficient across raceiethnic groups. Consequently, relatively few who did not have a mental disorder would have been referred for additional assessment. Of those with positive scores for a severe mental disorder on the CODSI-SMD, 55% of African Americans, 53% of Latinos, and 78% of Whites had a corresponding SCID diagnosis. The efficiency of the CODSI-SMD increases considerably when individuals with any mental disorder are included; in this instance, 89.7% of African Americans, 97.0% of Latinos, and 95.2% of Whites who had a positive score on the CODSI-SMD had a SCID diagnosis of a mental disorder, again demonstrating similar characteristics across raceiethnic groups. The disadvantage of using only the CODSI-SMD to identify those with any type of mental disorder is that the sensitivity (true positive) will be low, and many individuals who do have a mental disorder will be missed. Where assessment resources are in very short supply, using a combination of the CODSI-MD and the CODSI-SMD will assure the efficient use of those scarce resources; using either or both of the instruments will assure a culturally equitable means of identifying individuals in need of further assessment.

Limitations

Although the results of the current study are encouraging, readers should be cautious when generalizing these findings. Half the sample was drawn from four CJDATS sites (NDRI Rocky Mountain, Lifespan-Brown University, University of California at Los Angles, Texas Christian University); the additional African American and Latino offenders were sampled only from the NDRI Rocky Mountain site in Colorado. Furthermore, although the study increased the sample of African Americans and Latinos, after disaggregating by race/ ethnicity, the high prevalence of mental disorder meant that each subgroup contained few individuals without some sort of mental disorder. Also, given the low prevalence of severe mental disorders overall, relatively few individuals within each subgroup had a severe mental disorder. As a consequence, the point estimates of sensitivity for severe mental disorders and specificity for any mental disorder were less precise. In other words, a larger sample capable of more precise estimates could detect clinically meaningful differences in performance across racial/ethnic groups. Another limitation is the one-month maximum between the *Intake Interview* and screening battery, and the admission of the SCID; it would be preferable to eliminate the interval between the two interview sessions to avoid any influence that substance abuse treatment might have on mental disorder symptoms in the interim. Finally, the CODSI and SCID diagnoses were compared using lifetime disorders only; for those interested in more recent evidence of mental disorders, the data presented in this article will be overly inclusive of psychiatric diagnoses.

CONCLUSION AND FUTURE PLANS

The study presented in this paper provides additional evidence of the utility of the CODSI-MD and SMD to screen offenders in prison substance abuse treatment programs for the presence of a mental disorder. The findings support the use of the CODSI six-item screen to identify any mental disorder and the CODSI three-item screen to identify a severe mental disorder as a culturally fair test in terms of its relative performance across the major racial/ ethnic groups in state prison systems. The accuracy of the CODSI-MD and SMD compared well with those of other screening instruments (Sacks et al., 2007a, 2007b) and, in view of their brevity, the instruments present a viable option for those wanting to screen for any mental disorders or for severe mental disorders among African American, Latino, and White substance-abusing prisoners. Future research plans include testing the CODSI-MD and SMD

in conjunction with the TCU Drug Screen (Knight & Simpson, 2006; Knight, Simpson, & Hiller, 2002) as a screening strategy to identify individuals with co-occurring disorders, and the application of the combined instruments in other criminal justice populations and settings, such as jails, probation, and drug courts.

Acknowledgments

REFERENCES

Alexander M, Haugland G, Lin SP, Bertollo DN, McCorry FA. Mental health screening in addiction, corrections, and social service settings: Validating the MMS. International Journal of Mental Health and Addiction. 2007; 5 Retrieved November 21,2007, bom http://www.springerlink.com/content/8x804800w88h3788/ DOI: 10.1007/s11469-007-9100-x.

Baldassano CF. Assessment tool for screening and monitoring bipolar disorder. Bipolar Disorder. 2005; 7(1):8–15.

Bartels SJ, Drake RE, Wallach MA. Long-term course of substance use disorders among patients with severe mental illness. Psychiamk Seruices. 1995; 46(3):248–251.

Beck, AJ.; Karberg, JC. Prison and Jail Inmates at Midyear 2000. Bureau of Justice Statistics, Department of Justice; 2001. Retrieved April 1, 2007, from http://www.ojp.gov/bjs/pub/pdf/pjim00.pdf

Blackbum R. Classification and assessment of personality disorders in mental disordered offenders: A psychological perspective. Criminal Behaviour and Mental Health. 2000; 10:S8–S33.

Brandau, S.; Alexander, MJ.; Haugland, G. Screening for co-occurring disorders using the Modified MINI Screen (MMS): User's guide. 2005. Retrieved November 11, 2007, from http://www.oasas. state.ny.us/hps/research/documents/MINIScreenUsersGuide.pdf

Carroll JFX, McGinley JJ. A screening for identifying mental health problems in alcohol/other drug dependent persons. Alcohol Treatment Quarterly. 2001; 19(4):33–47.

Castel S, Rush B, Scalco M. Screening of mental disorders among clients with addictions. The need for population-specific validation. International Journal of Mental Health & Addiction. 2007; 5 Retrieved November 21, 2007, from http://www.springerlink.com/contenr/960ug254x17O46k1/?p=094f8666d2ee4bdf9dc1d1728d98cc11 & pi=38/ DOI: 10.1007/s11469-007-9096-2.

Center for Substance Abuse Treatment. Substance abuse treatment for persons with co-occurring disorders, Treatment Improvement Protocol (TIP) Services No. 42, DHHS Pub. No. (SMA) 05-3992, S. Sacks, Chair, and R. Reis, Co-Chair, Consensus Panel. Substance Abuse and Mental Health Services Administration (SAMHSA); Rockville, MD: 2005.

Charney DA, Paraherakis AM, Gill KJ. Integrated treatment of comorbid depression and substance use disorders. Journal of Clinical Psychiany. 2001; 62(9):672–677.

Cote G, Hodgins S. Co-occurring mental disorders among criminal offenders. Bulletin of the American Academy of Psychiatry and Law. 1990; 18:271–281.

Criminal Justice Drug Abuse Treatment Studies (CJDATS). Criminal Justice Drug Abuse Treatment Studies (CJDATS) intake interview. National Institutes of Health, Division of Epidemiology, Services and Prevention Research; Rockville, MD: 2005. Retrieved October 5, 2006, from http://cjdats.org/ka/ka-3.cfm?content_item_id=771&folder_id=23

Dennis ML, Chan Y, Funk RR. Development and validation of the GAIN short screener (GSS) for internalizing, externalizing and substance use disorders and crime/violence problems among adolescents and adults. The American Journal of Addictions. 2006; 15(Supplement 1):80–91.

Drake RE, McHugo GJ, Clark RE, Teague GB, Xie H, Miles K, Ackerson TH. Assertive community treatment for patients with co-occurring severe mental illness and substance use disorder: A clinical trial. American Journal of Orthopsychiatry. 1998a; 68(2):201–215. [PubMed: 9589759]

Drake R, Mercer-McFadden C, Mueser KT, McHugo GJ, Bond GR. Review of integrated mental health and substance abuse treatment for patients with dual disorders. Schizophrenia Bulletin. 1998b; 24(4):589–608. [PubMed: 9853791]

Drake R, O'Neal EL, Wallach MA. A systematic review of psychosocial research on interventions for people with co-occuning severe mental and substance use disorders. Journal of Substance Abuse Treatment. 2008; 34(1):123–138. [PubMed: 17574803]

Fazel S, Danish J. Serious mental disorder in 23,000 prisoners: A systematic review of 62 surveys. Lancet. 2002; 359(9306):545–550. [PubMed: 11867106]

First, MB.; Spitzer, RL.; Gibbon, M.; Williams, JBW. Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version, Patient Edition (SCID-I/P). Biometries Research, New York State Psychiatric Institutes; New York: 2002.

Hamson, PM.; Karberg, JC. Prison and jail inmates at midyear 2003. Bureau of Justice Statistics Bulletin U.S. Department of Justice Office of Justice Programs; 2004. Retrieved July 8,2008, from http://www.ojp.gov/bjs/pub/pdf/pjim03.pdf

Horn, JL.; Skinner, HA.; Wanberg, K.; Foster, FM.; the Alcoholism & Drug Addiction Research Foundation. Alcohol Dependence Scale. Addiction Research Foundation; 1984.

James, DJ.; Glaze, LE. Mental health problems of prison and jail inmates. Bureau of Justice Statistics Bulletin; U.S. Department of Justice, Office of Justice Programs; 2006.

Knight, K.; Simpson, DD. Texas Christian University Drug Screen. 2006. Retrieved April 1,2007, from http://www.ibr.tcu.edu/projects/crimjust/tcuds.html

Knight, K.; Simpson, DD.; Hiller, ML. Screening and referral for substance-abuse treatment in the criminal justice system. In: Leukefeld, CG.; Tims, F.; Farabee, D., editors. Treatment of drug offenders: Policies and issues. Springer; New York: 2002. p. 259-272.

Lurigio, AJ.; Swartz, JA. Criminal justice (2000): Changing the contours of the criminal justice system to meet the needs of persons with serious mental illness. In: Horney, J.; Martin, J.; Mackenzie, DL.; Peterson, R.; Rosenbaum, DP., editors. Policy, process, and decisions of the criminal justice system. National Institute of Justice; Washington DC:: 2000. p. 45-108.

Maffei C, Fossati A, Agostonid I, Barraco A, Bagnato M. Interrater reliability and internal consistency of the structured clinical interview for DSM-IV Axis II personality disorders (SCID-II). Journal of Personal Disorders. 1997; 11(3):279–284. version 2.0.

Magruder KM, Sonne SC, Brady KT, Quello S, Martin RH. Screening for co-occurring mental disorder in drug treatment populations. Journal of Drug Issues. 2005; 193:658–664.

McLellan AT, Arndt IO, Metzger DS, Woody GE, O'Brian CP. The effects of psychosocial services in substance abuse treatment. Journal of the American Medical Association. 1993; 269(15):1953–1959. [PubMed: 8385230]

Mumola, CJ. Substance abuse and treatment, State and Federal prisoners, (1997). Bureau of Justice Statistics Special Report U.S. Deparunent of Justice Office of Justice Programs; 1999.

Mumola, CJ.; Karberg, JC. Dnlg use and dependence, Statc and Federal prisoners, (2004). Bureau of Justice Statistics Special Report; U.S. Depament of Justice; Office of Justice Programs; 2006.

Ramirez Basco MR, Bostic JQ, Davies D, Rush AJ, Wine B, Hendrickse W, Barnett V. Methods to improve diagnostic accuracy in a community mental health setting. American Journal of Psychiatry. 2001; 157(10):1599–1605. [PubMed: 11007713]

Sacks S, Melnick G, Coen C, Banks S, Friendman PD, Grella C, Knight K. CJDATS Co-occurring Disorders Screening Instrument for Mental Disorders (CODSI-MD): A pilot study. The Frison Journal. 2007a; 87(1):86–110.

Sacks S, Melnick G, Coen C, Banks S, Friendman PD, Grella C, Knight K. CJDATS Co-occurring Disorders Screening Instrument (CODSI) for Menral Disorders (MD): A validation study. Criminal Justice and Behavior. 2007b; 34(9):1198–1215.

Sacks S, Pearson F. Co-occurring substance use and mental disorders in offenders: Approaches, findings and recommendations. Federal Probation. 2003; 67(2):32–39.

Sacks S, Sacks JY, McKendrick K, Banks S, Stommel J. Modified TC for MICA offenders: Crime outcomes. Behavioral Sciences and the Law. 2004; 22:477–501. [PubMed: 15282836]

Sacks S, Sacks JY, Stommel J. Modified TC for MICA inmates in correctional settings: A program description. Corrections Today. Oct..2003 :90–99.

Saxon AJ, Calsyn DA. Effects of psychiatric care for dual diagnosis patients treated in a drug dependence clinic. American Journal of Drug and Alcohol Abuse. 1995; 21(3):303–313. [PubMed: 7484981]

Steadman HJ, Scott JE, Osher F, Agnese TA, ClarkRobbins P. Brief Jail Mental Health Screen. Psychiatric Services. 2005; 56(7):816–822.

Sullivan CJ, McKendrick K, Sacks S, Banks SM. Modified TC for MICA offenders: Substance use outcomes. American Journal of Drug and Alcohol Abuse. 2007; 33(6):823–832. DOI: 10.10801/00952990701653800. [PubMed: 17994478]

Swartz JA, Lurigio AJ. Screening for serious mental illness in populations with co-occurring substance use disorder: Performance of the K6 scale. Journal of Substance Abuse Treatment. 2006; 31:287–296. [PubMed: 16996391]

Teplin LA, Swartz J. Screening for severe mental disorder in jail: The development of the Referral Decision Scale. Law and Human Behavior. 1989; 13:1–18.

U.S. Census. We the people: Blacks in the United States. 2000. Retrieved on April 1,2007, from http://www.census.gov/prod/2005pubs/censr-25.pdf

U.S. Department of Health and Human Services (DHHS). Menral health: A report of the Surgeon General (Chapter 2). Department of Health and Human Services (DHHS); Substance Abuse and Mental Health Services Administration (SAMHSA); Center for Mental Health Services (CMHS); National Institute on Mental Health (NIMH); Rockville, MD:: 1999.

Weisner C, Mertens J, Parthasarathy S, Moore C, Lu Y. Integrating primary medical care with addiction treatment. Journal of the American Medical Association. 2001; 286(14):1715–1721. [PubMed: 11594896]

Table 1

Demographic characteristics, unweighted data

Background characteristics—self-report	AfrAmer N=96 Mean, median, or %	Latino N=120 Mean, median, or %	White N=137 Mean, median, or %	p-value[§]
Mean age	36.03 (19–65)	32.74 (19–53)	36.02 (19–63)	0.396
% male	56.3%	60.8%	58.4%	0.792
% legally married	25.0%	23.3%	22.6%	0.914
% employed, last 6 months before incarceration (full or part time)	56.2%	59.2%	59.1%	0.692
Mean No. of children under 18	1.96 (0–8)	2.12 (0–8)	1.64 (0–6)	0.041[*]
Mean years of education	11.43 (6–17)	10.88 (6–16)	11.53 (6–19)	0.571
Criminal background				
Mean age at first arrest	17.47 (6–35)	17.05 (6–43)	19.50 (7–61)	0.178
Median No. of arrests, lifetime	13.00 (1–1800)	9.00 (1–200)	10.00 (1–999)	0.782
Median No. of drug related arrests, lifetime	5.00 (0–900)	5.00 (0–200)	6.00 (0–999)	0.781
Physical & mental health background				
% hospitalized for physical health problems, lifetime	66.7%	54.2%	67.9%	0.051
Mean No. of hospitalizations for psychiatric problems, lifetime	2.60 (0–100)	0.29 (0–6)	1.75 (0–99)	0.375
% ever hospitalized for psychiatric/emotional problems, lifetime	18.7%	11.8%	27.0%	0.008[†]
Bipolar I, SCID dx, lifetime	3.1%	0.8%	5.8%	0.086
Major depressive disorder, SCID dx, lifetime	17.7%	25.8%	29.9%	0.004[†]
Dysthymic disorder, SCID dx, lifetime	5.2%	2.5%	5.1%	0.709
Mood disorder due to general medical condition, SCID dx, lifetime	0.0%	0.0%	2.2%	0.092
Substance induced mood disorder, SCID dx, lifetime	4.2%	6.7%	9.5%	0.290
Schizophrenia, SCID dx, lifetime	3.1%	0.0%	0.7%	0.083
Brief psychotic disorder, SCID dx, lifetime	2.1%	0.0%	0.0%	0.068
Panic disorder, SCID dx, lifetime	10.4%	13.3%	8.0%	0.480
Posttraumatic stress disorder, lifetime	13.5%	15.8%	10.2%	0.488
Generalized anxiety disorder, lifetime	8.3%	5.8%	8.6%	0.339
Any mental disorder SCID diagnosis	66.7%	74.2%	73.7%	0.400
Severe mental disorder SCID diagnosis	30.2%	30.0%	43.1%	0.045[*]
Substance use background				
% received prior treatment for drug abuse, lifetime	67.7%	70.8%	57.7%	0.069
Median No. of times treated for substance use, lifetime	1.00 (0–32)	1.00 (0–18)	1.00 (0–104)	0.353
% injection drug use, lifetime	11.5%	24.2%	52.6%	<0.000[‡]
% use alcohol, lifetime	95.8%	100%	97.1%	0.100
% use marijuana, lifetime	90.6%	90.8%	94.2%	0.510
% use heroin, lifetime	12.5%	22.5%	34.3%	0.001[†]
% use cocaine, lifetime	51.0%	74.2%	82.5%	<0.000[‡]
% use methainphetamines, lifetime	22.9%	57.5%	71.5%	<0.000[‡]

AfrAmer = African American; dx = diagnosis.

Pearson chi-square *p*-value

§Reflects true value, not median or mean.

*
p <0.05;

†
p <0.01;

‡
p <0.001.

Table 2

Sensitivity— comparison of sensitivity of the CODSI-MD and SMD by race/ethnicity, weighted data

MD dx		AfrAmer $N = 96$ 69.6%	Latino $N = 120$ 73.6%	White $N = 137$ 71.8%	All racial/ ethnic groups	White $N = 137$ vs AfrAmer $N = 96$	White $N = 137$ vs Latino $N = 120$	AfrAmer $N = 96$ vs Latino $N = 120$
Instrument	Cut-off score	Sensitivity Any mental disorder			p-value	p-value	p-value	p-value
CODSI-MD	3	72.0% (61 –82)	81.0% (72 –89)	81.0% (73 –89)	0.299	0.168	0.983	0.187

SMD dx		AfrAmer $N=96$ 26.4%	Latino $N=120$ 29.0%	White $N=137$ 36.8%	All racial/ethnic groups	White $N=137$ vs AfrAmer $N=96$	White $N=137$ vs Latino $N=120$	AfrAmer $N=96$ vs Latino $N=120$
Instrument	Cut-off score	Sensitivity Severe mental disorder			p-value	p-value	p-value	p-value
CODSI-SMD	2	44.0% (25–63)	50.0% (33–67)	55.0% (41–69)	0.666	0.372	0.657	0.648

AfrAmer = African American, MD dx = mental disorder diagnosis; SMD dx = severe mental disorder diagnosis. Pearson chi-square p-value.

Table 3

Specificity— comparison of specificity of the CODSI-MD and SMD by race/ethnicity, weighted data

MD dx		AfrAmer N=96 69.6%	Latino N=120 73.6%	White N=137 71.8%	All racial/ ethnic groups	White N=137 vs AfrAmer N=96	White N=137 vs Latino N=120	AfrAmer N=96 vs Latino N=120
Instrument	**Cut-off score**	**Specificity Any mental disorder**			**p-value**	**p-value**	**p-value**	**p-value**
CODSI-MD	3	68.0% (51–85)	65.0% (48–81)	63.0% (48–78)	0.923	0.692	0.907	0.787

SMD dx		AfrAmer N=96 26.4%	Latino N=120 29.0%	White N=137 36.8%	All racial/ethnic groups	White N=137 vs AfrAmer N=96	White N=137 vs Latino N=120	AfrAmer N=96 vs Latino N=120
Instrument	**Cut-off score**	**Specificity Severe mental disorder**			**p-value**	**p-value**	**p-value**	**p-value**
CODSI-SMD	2	87.0% (79–95)	82.0% (74–90)	91.0% (85–97)	0.272	0.479	0.110	0.412

AfrAmer = African American; MD dx = mental disorder diagnosis; SvMD dx = severe mental disorder diagnosis. Pearson chi-square *p*-value.

Table 4

Other measures by race/ethnicity, weighted data

Any mental disorder

Race/ethnicity	Instrument	OAC	PPV	NPV	LR+	LR−	AUC
African American	CODSI-MD	71.0% (61–80)	84.0% (75–94)	50.0% (34–66)	2.23 (1.27–3.90)	0.42 (0.26–0.66)	0.697 (0.579–0.816)
Latino	CODSI-MD	76.0% (69–84)	87.0% (79–94)	54.0% (38–70)	2.27 (1.40–3.70)	0.30 (0.18–0.49)	0.726 (0.616–0.836)
White	CODSI-MD	76.0% (69–83)	85.0% (78–92)	56.0% (41–71)	2.19 (1.43–3.36)	0.30 (0.19–0.49)	0.720 (0.618–0.821)

Severe mental disorder

Race/ethnicity	Instrument	OAC	PPV	NPV	LR+	LR−	AUC
African American	CODSI-SMD	76.0% (67–84)	55.0% (33–77)	81.0% (73–90)	3.42 (1.61–7.27)	0.64 (0.45–0.92)	0.656 (0.521–0.790)
Latino	CODSI-SMD	73.0% (65–81)	53.0% (36–70)	80.0% (72–89)	2.83 (1.60–5.01)	0.61 (0.43–0.86)	0.662 (0.547–0.776)
White	CODSI-SMD	77.0% (70–84)	78.0% (64–91)	77.0% (69–85)	5.90 (2.92–11.95)	0.50 (0.36–0.68)	0.728 (0.634–0.822)

OAC = overall accuracy, PPV = positive predictive value, NPV = negative predictive value, LR+ = positive likelihood ratio, LR− = negative likelihood ratio, AUC = area under receiver operating characteristic curve.

NIH-PA Author Manuscript

NIH-PA Author Manuscript

NIH-PA Author Manuscript

Table 5

Clinical efficiency of CODSI-MD and SMD: percentage correctly identified as having a mental disorder, unweighted data

Instrument	Any mental disorder			Severe mental disorder		
	Afr Amer	Latino	White	Afr Amer	Latino	White
CODSI-MD	78.5%	86.7%	83.8%	—	—	—
CODSI-SMD	89.7%	97.0%	95.2%	58.6%	54.5%	83.3%