The Validity of TCU Drug Screen 5 for Identifying Substance Use Disorders among Justice-Involved Youth

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THE RATE OF SUBSTANCE use (SU) among individuals involved in the juvenile justice (JJ) system is high. JJ-involved youth are nine times more likely to develop a substance use disorder (SUD) when compared with youth who do not come into contact with the JJ system (Substance Abuse and Mental Health Services Administration, 2015). In fact, nationwide, 78 percent of JJ-involved youth report alcohol use, 85 percent report marijuana use, and 7 percent report opioid use (Zhang, 2004; Mulvey, Schubert, & Chassin, 2010; CASA, 2004; McClelland, Elkington, Teplin, & Abram, 2004). SU among this vulnerable JJ population is related to increased risk of delinquent behavior as well as future recidivism (Aalsma et al., 2015; Schubert, Mulvey, & Glasheen, 2011).

Identifying youth at risk of SUD as they enter the JJ system is an essential component of any approach designed to address SU and reducing recidivism risk (Farabee, Shen, Hser, Grella, & Anglin, 2001). As specified in the

risk-need-responsivity (RNR) model, three principles should guide assessment and treatment for persons involved in the justice system (Andrews, Bonta, & Hoge, 1990; Andrews, Bonta, & Wormith, 2011). The risk principle highlights the importance of first identifying an individual's level of risk of future offending in order to determine the necessary level of program intensity. The need principle states that rehabilitation programs should place emphasis on targeting the needs of the individual that are directly related to his or her criminal behaviors. The responsivity principle underscores the importance of choosing an intervention that aligns with the individual's learning style and capabilities. Increasingly, the RNR framework has been used to guide JJ system reforms and has resulted in systematic efforts to identify the unique needs of youth as agencies work toward lowering recidivism rates and increasing public safety (e.g., Schwartz, Barton, & Orlando, 1991; Seigle, Walsh, & Weber, 2014).

According to the Juvenile Justice Behavioral Health Services Cascade (Belenko et al., 2017), the first step in a best-practice approach to addressing SU needs among youth is through universal and evidence-based screening. This means that all youth should be screened upon entry into the JJ system using a brief tool that has been validated through systematic research

and that maps to clinically meaningful indicators of SU problems. Screening results above a given threshold should be used to trigger a comprehensive assessment, and information from both screening and assessment should inform the frequency, intensity, and content of recommended treatment services (Belenko et al., 2017). JJ agencies, however, often fall short of screening 100 percent of youth. Indeed, only 78 percent of youth who enter the JJ system ever receive a screening instrument, and only 52 percent ever receive a full assessment (Dennis et al., 2018). As a result, only 65 percent of youth entering the JJ system have their needs identified (Dennis et al., 2018).

Furthermore, many existing SU screeners in use with JJ-involved youth are not validated and/or do not map directly onto state-of-the-art clinical diagnostic tools such as the Diagnostic and Statistical Manual of Mental Disorders V-R (DSM-5; American Psychiatric Association, 2013). While commonly used within JJ setting, risk assessment tools that include SU items are not designed to diagnose SU or mental health problems (Vincent, Guy, & Grisso, 2012); yet many JJ agencies rely solely on risk and need assessments when making SU referral decisions. Identifying SU treatment needs also can be hindered by limited staff resources (e.g., lack of training on how to administer

and interpret screeners), financial resources (e.g., costs associated with some validated instruments), and time to administer (e.g., unnecessarily lengthy instruments).

These barriers highlight the need for an evidence-based screening tool that is readily accessible, brief, maps on to the DSM-5 criteria for SUDs, and is easy to administer and interpret. One promising brief (and free) screener is the TCU Drug Screen 5 (TCU DS 5), which comprises 17 self-report items that map directly onto the DSM-5 criteria for SUDs. Originally developed based on the DSM-3R (Knight, Blue, Flynn, & Knight, 2018), the TCU DS was updated to reflect changes put forth in the DSM-5 (e.g., use of "disorder" instead of "dependence;" addition of three classifications: mild, moderate, and severe disorders). When the two versions of the TCU DS were compared in a sample of justice-involved adolescents and adults, results indicated similar SUD classification rates; however, the TCU DS 5 diagnosed significantly more individuals with a SUD, most of whom were classified as mild (Knight, Blue, Flynn, & Knight, 2018).

Despite the TCU DS 5's superiority in identifying individuals with SU problems, the validity of the TCU DS 5 has yet to be demonstrated, particularly among a JJ population. Therefore, the purpose of the current study is to assess the validity of the TCU DS 5 screener by comparing it against a state-of-the-art assessment instrument: the Global Appraisal of Individual Needs (GAIN).

Adolescent self-reports of SU on the GAIN have previously been shown to be consistent with parent reports (Dennis, Titus Diamond, et al., 2002) and on-site urine analyses (UAs; Godley, Godley, Dennis, Funk, & Passetti, 2002). Additionally, 24 months after intake, GAIN self-reports of SU were found to be consistent with any self-report, positive UA, or positive saliva test for any drug, cocaine, opioids, and marijuana (Dennis, Scott, & Funk, 2003).

Method

Participants

The study sample consisted of 320 male detainees, recruited from two male-only Midwestern JJ centers. Participant age ranged from 13 to 20 years old ($M = 16.67$, $SD = 1.33$); 63 percent of the sample identified as African American, 23 percent as white, and 14 percent as Hispanic. Seventeen participants were excluded from analyses due to missing data on the TCU DS 5 or GAIN subscales, resulting in a final sample of 303 male adolescents.

Procedure

Approval from the Institutional Review Board was obtained prior to study implementation. Data were collected from the juvenile participants at the two Midwestern correctional facilities. All new admissions between January and May 2016 completed the TCU DS 5 screener and GAIN assessment during the intake process. A data-sharing agreement was enacted between the agency and research center and de-identified data were shared through a secure data service. Before submitting the datasets to the research center for secondary analysis, JJ agency staff assigned a unique identifier to each youth (which enabled linking TCU DS 5 and GAIN data) and ensured that all personally identifiable information was removed.

Measures

The TCU DS 5 is an evidence-based screener that can be administered to both adolescents and adults (Knight, Becan, Landrum, Joe, & Flynn, 2014; Knight, Blue, Flynn, & Knight, 2018) as an independent self-report or during small groups (with respondents following along as a proctor reads each item aloud). Participants first respond to a series of yes/no questions regarding their SU over the last 12 months (prior to being incarcerated, if applicable). There are 17 items in total, taking approximately five minutes to complete. The first 11 items can be summed to produce a total score ranging from 0 to 11 ("yes" to either item 10a or 10b [tolerance criteria; e.g., "Did you need to increase the amount of a drug you were taking so that you could get the same effects as before?"] and either 11a or 11b [withdrawal criteria; e.g., "Did you ever keep taking a drug to relieve or avoid getting sick or having withdrawal symptoms?"] each counts as 1). Although items 12 through 17 are not included as part of the total score, these items inform treatment decisions (e.g., "Which drug caused the most serious problem during the last 12 months?"). Interpretation of the TCU DS 5 total score corresponds with the DSM-5 criteria for SUDs (American Psychiatric Association, 2013): a score of 0-1 indicates no SUD, 2-3 indicates a mild SUD, 4-5 indicates a moderate SUD, and 6 or higher indicates a severe SUD.

The Global Appraisal of Individual Needs (GAIN; Dennis, 1999) is an evidence-based comprehensive assessment administered in an interview format that can also be used with both adults and adolescents. It takes approximately 120 minutes to complete the full GAIN

assessment (Dennis, Titus, White, Unsicker, & Hodgkins, 2003). To assess convergent validity of the TCU DS 5, three SU subscales were used: Substance Frequency Scale (SFS), Substance Problem Scale—Lifetime (SPSL), and Substance Problem Scale—Past Month (SPSM). The SFS is the average percentage of days (in the past 90 days) reported of any alcohol or other drug use, including marijuana, crack/cocaine, heroin/opioid, and other drug use. The SPSL is a count of lifetime symptoms of substance abuse, dependence, and substance-induced health and psychological disorders based on the DSM-IV. The SPSM is composed of the same items as the SPSL, but responses are given for the past month.

To assess discriminant validity, four additional GAIN subscales were analyzed. The Treatment Motivation Index (TMI) represents a count of five items endorsed regarding the client's perception of sources of external pressure to be in treatment and his or her own need for treatment, support for treatment, and hope for health through treatment (e.g., "Do you currently feel you can get the help you need in an alcohol or drug treatment program?"). The Self-Efficacy Scale (SES) is a count of five items on the number of ways the client believes he or she could avoid thinking about or using alcohol or drugs (e.g., "Do you currently think you could avoid using alcohol or drugs with your friends?"). The number of non-SU DSM diagnoses and the number of prior convictions were also assessed via the GAIN.

Analytic Plan

Cross tabulations were used to compare TCU DS 5 and GAIN classifications, and Kappa coefficients were used to measure the degree of chance-corrected agreement between the classification rates. Because the GAIN subscales correspond to three categories (no SUD, abuse, or dependence) and the TCU DS 5 corresponds to four categories (no SUD, mild, moderate, or severe SUD), TCU DS 5 outcomes were collapsed so that Kappa coefficients could be calculated: TCU DS 5 "no diagnosis" (score of 0-1), mild/moderate SUD (score of 2-5), and severe SUD (score of 6 or greater). The analyses were performed a second time, further collapsing GAIN outcomes into "no diagnosis" versus "diagnosis" and TCU DS 5 outcomes into "no diagnosis" (score of 0-1) versus "diagnosis" (score of 2 or greater).

Convergent and divergent validity was assessed using a Pearson product-moment correlation to examine the relationship

between GAIN and TCU DS 5 outcomes with theoretically related GAIN subscales (convergent validity) and theoretically unrelated GAIN subscales (divergent validity). For convergent validity, GAIN and TCU DS 5 outcomes were analyzed against the TMI and SES of the GAIN. For divergent validity, GAIN and TCU DS 5 outcomes were analyzed against the number of non-SU DSM diagnoses and number of prior convictions.

Results

The average number of items endorsed among juveniles on the TCU DS 5 was 3.18 (SD = 3.85). For the GAIN, average scores for the SFS, SPSL, and SPSM were 18.53 (SD = 18.41), 5.83 (SD = 4.57), and 1.13 (SD = 2.63), respectively. Results revealed a statistically significant, positive correlation between the continuous measures of the TCU DS 5 and the SFS (r = 0.14, N = 303, p = .014, $R2$ = 0.02) and SPSL (r = 0.25, N = 303, p ≤ .001, $R2$ = 0.06); however, there was no significant correlation

between the continuous measures of the TCU DS 5 and SPSM (r = 0.03, N = 303, p = .580, $R2$ = 0.001). The TCU DS 5 classification rates are summarized in Table 1.

The drug that triggered the most serious problem during the previous 12 months, according to responses on the TCU DS 5, was marijuana (34.6 percent), followed by alcohol (4.8 percent), synthetic marijuana (often referred to as "K2" or "spice"; 3.2 percent), and methamphetamine (2.6 percent). Interestingly, despite only 34.6 percent of the sample reporting marijuana as causing the most serious problem, 43.3 percent reported daily marijuana use. Among the other most problematic substances, 4.8 percent reported daily alcohol use, 3.8 percent reported daily synthetic marijuana use, and 1.9 percent reported daily methamphetamine use.

Cross tabulations were conducted comparing TCU DS 5 SUD classification (0 = score of less than 2, 1 = score of 2 or greater) to any SFS, SPSL, or SPSM SUD classification (0 =

score of 0, 1 = score of 1 or greater; see Table 2). Cohen's Kappa coefficients were calculated to determine if there was agreement between the TCU DS 5 and GAIN subscales diagnosis of any SUD for the juveniles. There was significant agreement between TCU DS 5 and SFS diagnosis of any SUD, κ = 0.15, p = .002, 95% CI [0.06, 0.25]. There also was significant agreement between TCU DS 5 and SPSL diagnosis of any SUD, κ = 0.15, p ≤ .001, 95% CI [0.07, 0.23]. However, agreement between TCU DS 5 and SPSM diagnosis of any SUD was not significant, κ = 0.05, p = .307, 95% CI [-.05, .15]. These results indicate that the TCU DS 5 and GAIN SFS and SPSL subscales are diagnosing youth SUD in a similar manner.

Cross tabulations were again used to compare TCU DS 5 SUD severity diagnosis (0 = score of less than 2, 1 = score of 2-5, 2 = score of 6 or greater) to SFS SUD severity diagnosis (0 = score of 0, 1 = score of 1-13, 2 = score of 14 or greater), SPSL (0 = score of 0, 1 = score of 1-9, 2 = score of 10-16), or SPSM SUD diagnosis (0 = score of 0, 1 = score of 1-9, 2 = score of 10-16; see Table 3, next page). Cohen's Kappa coefficients were calculated to determine if there was agreement between the TCU DS 5 and GAIN subscales' diagnosis of SUD severity for the juveniles. Again, there was significant agreement between TCU DS 5 and SFS severity of SUD, κ = 0.11, p = .002, 95% CI [0.04, 0.19]. There was also significant agreement between TCU DS 5 and SPSL severity of SUD, κ = 0.09, p = .004, 95% CI [0.03, 0.15]. However, agreement between TCU DS 5 and SPSM severity of SUD was not significant, κ = 0.01, p = .883, 95% CI [-0.07, 0.08]. These results again indicate that the TCU DS 5 and GAIN SFS and SPSL subscales are diagnosing youth SUD in a similar manner.

To test for convergent validity, Pearson product-moment correlations between TMI and Self-Efficacy Scale and the continuous scores for the TCU DS 5 and GAIN SFS, SPSL, and SPSM were computed. The results revealed that TCU DS 5 was significantly positively related to TMI scores (r = 0.25, N = 299, p ≤ .001). TMI scores were also positively related to SFS (r = 0.25, N = 307, p ≤ .001), SPSL (r = 0.65, N = 307, p ≤ .001), and SPSM (r = 0.35, N = 307, p ≤ .001). Additionally, TCU DS 5 was significantly negatively related to SES scores (r = -0.15, N = 303, p = .011). SES scores were also significantly negatively related to SFS (r = -0.30, N = 311, p ≤ .001), SPSL (r = -0.48, N = 311, p ≤ .001), and SPSM (r = -0.39, N = 311, p ≤ .001). These results provide evidence for the convergent validity of the TCU DS 5.

TABLE 1
TCU Drug Screen 5 classification rates.

	No SUD	Mild SUD	Moderate SUD	Severe SUD
# of Juveniles	161	41	29	81
% of Sample	51.6%	13.1%	9.3%	26.0%

Note: SUD = substance use disorder.

TABLE 2
TCU Drug Screen 5 and GAIN Substance Frequency Scale, Substance Problem Scale—Lifetime, and Substance Problem Scale—Past Month classifications of SUD or no SUD.

		TCU Drug Screen 5		
		No SUD	SUD	Total
Substance Frequency Scale	No SUD	49 16.2%	24 7.9%	73
	SUD	106 35.0%	124 40.9%	230
	Total	155 51.2%	148 48.8%	303
Substance Problem Scale—Lifetime	No SUD	34 11.2%	10 3.3%	44
	SUD	121 39.9%	138 45.5%	259
	Total	155 51.2%	148 48.8%	303
Substance Problem Scale—Past Month	No SUD	117 38.6%	104 34.3%	221
	SUD	38 12.5%	44 14.5%	82
	Total	155 51.2%	148 48.8%	303

Note: SUD = substance use disorder.

TABLE 3
TCU Drug Screen 5 and GAIN Substance Frequency Scale, Substance Problem Scale—Lifetime, and Substance Problem Scale—Past Month classifications of SUD.

		TCU Drug Screen 5			
		No SUD	Mild/Moderate SUD	Severe SUD	Total
Substance Frequency Scale	No SUD	49 16.2%	9 3.0%	15 75.0%	73
	Abuse	44 14.5%	23 7.6%	17 5.6%	84
	Dependence	62 20.5%	38 12.5%	46 15.2%	146
	Total	155 51.2%	70 23.1%	78 25.7%	303
Substance Problem Scale—Lifetime	No SUD	34 11.2%	2 0.7%	8 2.6%	44
	Abuse	44 14.5%	13 4.3%	10 3.3%	67
	Dependence	77 25.4%	55 18.2%	60 19.8%	192
	Total	155 51.2%	70 23.1%	78 25.7%	303
Substance Problem Scale—Past Month	No SUD	117 38.6%	46 15.2%	58 19.1%	221
	Abuse	22 7.3%	9 3.0%	12 4.0%	43
	Dependence	16 5.3%	15 5.0%	8 2.6%	39
	Total	155 51.2%	70 23.1%	78 25.7%	303

Note: SUD = substance use disorder.

To test for divergent validity, Pearson product-moment correlations between number of non-SU DSM diagnoses and number of prior convictions and the continuous scores for the TCU DS 5 and GAIN SFS, SPSL, and SPSM were computed. The results revealed that there was no significant relationship between TCU DS 5 and number of non-SU DSM diagnoses ($r = 0.09$, $N = 283$, $p = .128$). Number of non-SU DSM diagnoses also were not significantly related to SFS ($r = -0.01$, $N = 290$, $p = .899$), SPSL ($r = 0.11$, $N = 290$, $p = .055$), or SPSM ($r = 0.03$, $N = 290$, $p = .606$). Additionally, TCU DS 5 was not significantly related to number of prior convictions ($r = -0.04$, $N = 304$, $p = .511$). Number of prior convictions also was significantly unrelated to SFS ($r = -0.06$, $N = 311$, $p = .290$) or SPSM ($r = -0.08$, $N = 311$, $p = .140$). However, SPSL was significantly negatively related to the number of prior convictions ($r = -0.13$, $N = 311$, $p = .027$). These results provide evidence for the discriminant validity of the TCU DS 5.

Discussion

The current study helps establish the validity of the TCU DS 5 as an evidence-based SU screener by comparing it to a well-established and well-validated assessment instrument. The TCU DS 5 is comparable to the GAIN, especially with assessment questions designed to diagnose SUD over similar time frames. The TCU DS 5 appears to be more in line with lifetime SU scales from the GAIN rather than past month, which is not surprising given that the time frame for the TCU DS 5 is 12 months (identical to the DSM-5 and closer to "lifetime" for some adolescents). The TCU DS 5 was related to expected domains of treatment motivation and self-efficacy, and not related to divergent domains (number of non-SU DSM diagnoses and prior convictions). When examining the interrelations among SU and other indicators, patterns of associations with the TCU DS 5 are similar to those seen for comparable GAIN scores. These results justify the use of the TCU DS 5 as a quick, cost-effective method for screening for SU in

adolescents in JJ settings.

The TCU DS 5 represents a viable and cost-effective option for JJ agencies seeking to identify and link youth with SUDs to needed services. The TCU DS 5 is available for free, and can be easily implemented as part of a comprehensive best-practice approach to addressing SU among juveniles (Belenko et al., 2017). Because it maps directly on to DSM-5 criteria, it can serve as a supplement to standard needs and risk assessments administered to all youth as part of standard intake procedures and can more appropriately inform referral decisions regarding further assessment of appropriate levels of care (Mee-Lee, 2013).

Incorporating any new tool into standard practice, including the TCU DS 5, should be done systematically, particularly given the implementation challenges typically experienced within justice settings (see Aarons, Hurlburt, & Horwitz, 2011). For example, if an oversight agency mandates use of a specific screener that does not map to the DSM-5, agency leadership may need to train individuals responsible for conducting youth screening protocols on the benefits of adding a new tool in order to reduce resistance and gain buy-in. Likewise, agencies might consider piloting the new screening tool with a subset of incoming youth, solicit input (e.g., from probation or court officers, behavioral health partners to which JJ refers youth) and address any problems in implementing it prior to agency-wide roll out. Ideally, experts in the JJ field recommend that screens be given to youth within 24 hours of admission, repeated regularly while they are in custody, and given again prior to release (Wasserman et al., 2003). Timely screening of youth as they enter the JJ system would result in increased identification of youth in need of referral to services. Additionally, timely screening could improve communication between adolescents and juvenile probation officers during the intake process, which in turn could facilitate communication of the identified needs between the probation officers and behavioral health staff (particularly because DSM-5 criteria are used by behavioral health clinicians; McLellan & Meyers, 2004). The results of the screens can then be used to outline explicit decision criteria for service referrals within the JJ system.

Despite the positive implications of this study, there are limitations that should be addressed. First, this study is limited by the differing timetables of the TCU DS 5 and GAIN. While the TCU DS 5 uses a 12-month

time frame (identical to the DSM-5 time frame), the GAIN covers the past 90 days (SFS), lifetime (SPSL), or past month (SPSM). Although the results follow a similar pattern, with the TCU DS 5 identifying fewer instances of SUD than SPSL and more instances of SUD than SFS and SPSM, it would be helpful to compare the TCU DS 5 to an assessment that covers SU during the past 12 months. The TCU DS 5 maps on to the DSM-V, while the GAIN maps on to the DSM-IV. The different versions of the DSM categorize SUD differently: the DSM-IV categorizes SUD as none, abuse, or dependence, while the DSM-V categorizes it as none, mild, moderate, or severe. Due to this limitation, the analyses performed required that the TCU DS 5 (DSM-V) be collapsed across the mild and moderate categories. Additionally, the sample consisted of only male juveniles, and findings may not generalize to females or adolescents in non-justice settings. For these reasons, the results should be replicated with female and non-justice samples.

The current study provides a case for the validity of the TCU DS 5 as a SU screener for JJ-involved youth. The TCU DS 5 can be implemented into routine intake procedures within JJ systems, which would increase the number of youth whose SU needs are identified. As a result, more youth potentially would be linked to treatment services and matched with the appropriate level of care. In instances where quick decisions need to be made regarding referral for SU services (e.g., when staff resources and time do not permit comprehensive assessment), the TCU DS 5 offers a valid and viable means for determining which youth should be linked to behavioral health providers. While this screener is not intended to replace comprehensive assessment in cases where a potential SUD is identified, it offers a simple way to improve identification and streamline existing assessment and treatment linkage protocols. Consistent use of evidence-based SU screeners is the first step in identifying and addressing the behavioral health treatment needs of this vulnerable population and reducing likelihood of continued substance use and delinquency.

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