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Psychometric Properties of the Turkish Versions of the Drug Use Disorders Identification Test (DUDIT) and the Drug Abuse Screening Test (DAST-10) in the Prison Setting

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Abstract — The aim of this study was to evaluate psychometric properties of the Drug Use Disorders Identification Test (DUDIT) and the Drug Abuse Screening Test (DAST-10) in prisoners with (n = 124) or without (n = 78) drug use disorder. Participants were evaluated with the DUDIT, the DAST-10, and the Addiction Profile Index-Short (API-S). The DUDIT and the DAST-10 were found to be psychometrically sound drug abuse screening measures with high convergent validity when compared with each other (r = 0.86), and API-S (r = 0.88 and r = 0.84, respectively), and to have a Cronbach's α of 0.93 and 0.87, respectively. In addition, a single component accounted for 58.28% of total variance for DUDIT, whereas this was 47.10% for DAST-10. The DUDIT had sensitivity and specificity scores of 0.95 and 0.79, respectively, when using the optimal cut-off score of 10, whereas these scores were 0.88 and 0.74 for the DAST-10 when using the optimal cut-off score of 4. Additionally, both the DUDIT and the DAST-10 showed good discriminant validity as they differentiated prisoners with drug use disorder from those without. Findings support the Turkish versions of both the DUDIT and the DAST-10 as reliable and valid drug abuse screening instruments that measure unidimensional constructs.

Keywords — DAST-10, drug use disorder, DUDIT, factor analysis, reliability, validity

INTRODUCTION

Several drug abuse screening instruments have been developed to assess the severity of substance abusers' drug use (Mdege & Lang 2011). Two of the most frequently used instruments are the Drug Use Disorders Identification Test (DUDIT) (Berman et al. 2005) and the Drug Abuse Screening Test (DAST) (Skinner 1982).

The 11-item DUDIT was developed as an analogous instrument to the Alcohol Use Disorders Identification

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Test, AUDIT (Saunders et al. 1993). The DUDIT assesses illicit drug use and related consequences over the past year and collects data in the following areas: (1) frequency of drug use; (2) drug-related problems; and (3) drug dependence symptoms. In their initial investigation of the psychometric properties of the DUDIT, Berman et al. (2005a; 2005b) used both general population (Cronbach's α of 0.93) and clinical samples (Cronbach's α of 0.80). Further studies that evaluated the psychometric properties of the DUDIT supported the construct of the scale, which was found to be a psychometrically sound drug abuse screening measure with both convergent and discriminant validity (Landheim et al. 2006; Bakken et al. 2007; Bakken & Vaglum 2007; Cruce et al. 2007; Cruce & Ojehagen 2007; Hodgins et al. 2007; 2008; Berman et al. 2008; Voluse et al. 2012). The DUDIT has been also used in a sample of suspected offenders with signs of mental health problems (Durbeej et al. 2010) and patients in first-episode psychosis (Nesvag et al. 2010).

The original DAST is a 28-item screening instrument modeled after the Michigan Alcohol Screening Test, or MAST (Gibbs 1985), and classifies individuals on a continuum from low to high drug problem severity in the past year (Skinner 1982). Skinner (1982) also developed 20- and 10-item versions of the DAST, both of which had high internal consistency (Cronbach's $\alpha > 0.85$), acceptable test–retest reliabilities ($r > 0.70$), correlated highly with the 28-item DAST, and discriminated drug abusers from alcohol abusers (Gavin et al. 1989; Skinner & Goldberg 1986; Yudko et al. 2007). The DAST-10 has been shown to have good internal consistency (Cronbach's α between 0.86 and 0.94), temporal stability, and the ability to identify individuals who need more intensive assessment for substance abuse problems (Cocco & Carey 1998; Bedregal et al. 2006; Carey et al. 2003). No validity studies were identified for DAST-10 (Mdege & Lang 2011). Nevertheless, the DAST-10 was also succesfully used in web-based surveys in undergraduate students (McCabe et al. 2006; Kaloyanides et al. 2007) and in adults with severe and persistent mental illness (Maisto et al. 2000).

Although a variety of drug use measures exist, the DUDIT and the DAST-10 have advantages over other instruments. For example, unlike the Addiction Severity Index (ASI) (McLellan et al. 1980), the DUDIT's and the DAST-10's administration time is brief (<5 mins). Also, unlike drug screening measures that inquire about lifetime use, such as the drug-adapted version of the CAGE—Cage-AID (Brown & Rounds, 1995), the DUDIT and the DAST-10 focus on drug use and drug-related consequences occurring within the past year, thus identifying possible diagnosable drug use problems. The DUDIT also has another advantage. Unlike dichotomous scaling used by the DAST-10 (Skinner 1982) and the CAGE-AID (Brown & Rounds 1995), DUDIT items are scored using continuous interval scaling, which has been found to reduce underreporting of drug use and related consequences (Saunders et al. 1993). Consequently, the DUDIT and DAST-10 were two of the 13 instruments suggested for use in general hospital wards as screening tools for detecting illicit drug use/abuse (Mdege & Lang 2011).

Although the Turkish version of the AUDIT (Saunders et al. 1993; Saatcioglu et al. 2002) and the MAST (Gibbs 1985; Coskunol et al. 1995) have been widely used to identify alcohol use problems in Turkey in the last decade, the DUDIT and the DAST-10 are not validated in the Turkish population. Thus, the aim of the present study is to evaluate the psychometric properties of the DUDIT and the DAST-10 in a Turkish prison setting.

METHODS

Subjects

The data were gathered from the Umraniye "T"-type prison in Istanbul. In this prison, there were 24 wards that included 10 prisoners each. Among 240 prisoners that were invited to participate in the study, 32 (13.3%) refused, and 2.9% (n = 6) of those who participated were excluded since they did not cooperate or because of illiteracy. Thus, the prisoners (n = 202, 84.2%) sentenced for different crimes were included in the study as a sample of convenience. Mean age (n = 32, 36.19 ± 10.38) and duration of education (6.13 ± 3.67) of those who refused participation did not differ from those who participated (n = 202, 35.81 ± 9.51, t = −0.21, p = 0.84, 6.88 ± 3.25, t = 1.19, p = 0.24, respectively). Similarly, marital and employment status did not differ between the two groups ($\chi^2 = 1.10$, df = 2, p = 0.58 and $\chi^2 = 0.53$, df = 2, p = 0.77, respectively).

Participants were classified as prisoners with drug use disorder (PD; n = 124) and prisoners without drug use disorder (PWD; n = 78). The second group was included to evaluate the discriminant validity of the DUDIT. Group membership was made by interview based on the substance use disorder module (module E) of the Turkish version of the Structured Clinical Interview for DSM-IV (SCID-I) (First et al. 1997; Corapcioglu et al. 1999). The SCID was not routinely used in the prison setting and was administered for the present study by a trained interviewer (K.O.).

The study was approved by the ethical committee of the Bakirkoy Training and Research Hospital for Psychiatry Neurology and Neurosurgery. Participants' written informed consent was obtained after the study protocol was thoroughly explained.

Translation

The original DUDIT and DAST-10 were independently translated from English into Turkish by two experts in addiction psychiatry. Consensus was reached on a common draft by these experts. This Turkish version was translated back into English by an independent translator.

Final versions were approved by the developers of the original scales.

Assessments

Participants completed the DUDIT, the DAST-10, the API-S, and a short questionnaire gathering demographic and substance abuse history information.

The DUDIT is an 11-item self-report questionnaire designed to screen individuals for drug problems (Berman et al. 2005). The first nine questions are scored on five-point scales ranging from 0 to 4, and last two are scored on three-point scales with values of 0, 2, and 4. Thus, total scores range from 0 to 44, with higher scores suggestive of a more severe drug problem.

The DAST-10 is frequently used in the drug abuse field and has demonstrated sound psychometric properties (Yudko et al. 2007). The DAST assesses drug consequences and problem severity in the past year (Skinner 1982). The original 28-item DAST, modeled after the MAST (Gibbs 1985), has a unidimensional construct when factor analyzed (Skinner 1982). All versions of the DAST (28-, 20- and 10-item) have been found to have moderate to high levels of validity, sensitivity, and specificity (Yudko et al. 2007). Since the 10-item version of the DAST has comparable sensitivity and specificity to its 28- and 20-item counterparts (Mdege & Lang 2011), the former was used in the present study. For the Turkish version of the DAST-10, scores range from 0 to 10, with a score of 4 or greater being suggestive of a drug problem.

The Addiction Profile Index (API) is a self-report questionnaire consisting of 37 items and the following five subscales: characteristics of substance use; dependency diagnosis; the effects of substance use on the user; craving; motivation to quit using substances (Ogel et al. 2012). The scale was found to be valid and the Cronbach's α coefficient for the total API was 0.89, while for the subscales it ranged from 0.63 to 0.86. The API-Short (API-S) was developed as a shorter version of API, composed of 22 questions, to be used as a screening tool (Ogel et al. 2011). The correlation between the original form and the short version of the form was 0.96 and the internal consistency of the new scale was satisfactory (Cronbach α = 0.89). Thus, the results have shown that API-S is a valid and reliable instrument, and can be used as a screening tool (Ogel et al. 2011).

Data Analysis

The following strategies were used to investigate the psychometric properties of the DUDIT and the DAST-10: (1) factoral structure was examined using a principal component analysis (PCA); (2) convergent validity was evaluated by calculating a Pearson product–moment correlation between the DUDIT, DAST-10, and API-S; (3) internal consistency was assessed using Cronbach's α; (4) predictive validity, sensitivity, specificity, and optimal cut-off scores were estimated by constructing a Receiver Operating Characteristic (ROC) curve; and (5) discriminant validity was evaluated using a Students' t test of the DUDIT and the DAST-10 scores for the two groups of participants.

RESULTS

Table 1 presents demographic variables for the two groups of participants (PD and PWD). There were no differences between the groups in marital and employment status, whereas both the current age and the duration of education were lower in the PD group. These findings are coherent with the previous studies conducted in prison settings, which suggested that age-based factors correlate with participant's history of substance use disorder (Stephens et al. 2007). Both using substance and having a criminal life style may interfere with education in this population.

Factorial Structure

To explore the factorial structure of the DUDIT and the DAST-10, a PCA was performed using all participants (N = 202). Criteria for retaining extracted components on the PCA were: (1) visual inspection of the scree plot to note breaks in size of Eigenvalues between the components; (2) Eigenvalues greater than one; and (3) percentage of variance accounted for by components retained.

To explore construct validity of the scales, first exploratory factor analyses then confirmatory factor analyses were conducted. Prior to any further analysis, the adequacy of sample size was verified using the Bartlett's test of sphericity and the Keiser-Meyer-Olkin (KMO) measurement of sampling adequacy. Bartlett's test of sphericity was significant (Chi-Square = 1366.761, df = 55, $p < 0.001$) for the DUDIT and the KMO measure of sampling adequacy was acceptable at 0.924. Similarly, Bartlett's test of sphericity was significant (Chi-Square = 806.902, df = 45, $p < 0.001$) for the DAST-10 and the KMO measure of sampling adequacy was acceptable at 0.872.

For the DUDIT, a visual inspection of the scree plot revealed two components accounting for the majority of variance before components started to level off. One component on the DUDIT reached the criterion of an Eigenvalue greater than one (6.41) and the variance accounted for by this component was 58.28%. The unidimensionality of the scale then was assessed subsequently with confirmatory factor analysis (CFA). Estimation of the model produced a good fit (χ^2/df = 39.657/35 = 1.13; root mean square error of approximation [RMSEA] = 0.026, goodness of fit index [GFI] = 0.965, adjusted GFI = 0.933, parsimony GFI = 0.511, normed fit index [NFI] = 0.972, comparative fit index [CFI] = 0.997, incremental fit index [IFI] = 0.997). As generally accepted, we took criteria as Chi-Square, df ≤ 5, > 0.90 for GFI, CFI, NFI and

TABLE 1
Characteristics of Participants by Group

	No Drug Use Disorder n = 78		Drug Use Disorder n = 124			
	n	%	n	%	χ^2/	P
Marital status					5.93/2	0.051
Single	28	35.9	65	52.4		
Maried	35	44.9	37	29.8		
Divorced/widow	15	19.2	22	17.7		
Employment status					3.46/2	0.177
Without employment	56	71.8	83	66.9		
Employed	19	24.4	27	21.8		
Part-time employed	3	3.8	14	11.3		
Age (mean ± sd)	38.14	±9.44	34.34	±9.28	**t** = 2.82	0.005
Education (mean ± sd)	7.53	±3.27	6.47	±3.19	**t** = 2.22	0.027

TABLE 2
Item-Component Loadings for the Drug Use Disorders Identification Test (DUDIT) and the Drug Abuse Screening Test (DAST-10) (n = 202)

Items	DUDIT	DAST-10
1	0.769	0.742
2	0.781	0.661
3	0.805	0.706
4	0.740	0.632
5	0.765	0.655
6	0.808	0.724
7	0.789	0.757
8	0.813	0.690
9	0.649	0.735
10	0.771	0.530
11	0.690	
Mean ± S.D.	18.92 ± 14.29	4.79 ± 3.35
Eigenvalue	6.41	4.71
% of Variance	58.28	47.10
Cronbach's α	0.93	0.87

IFI, and for RMSEA <0.05 being perfect when evaluating the fit index (Byrne 2010; Hair et al. 2010). As seen in Table 2, all item-component loadings were in the "good" to "excellent" range. Thus, results from the PCA and the CFA suggest that the DUDIT assesses a unidimensional construct.

For the DAST-10, a visual inspection of the scree plot revealed two components accounting for the majority of variance before components started to level off. Two components on the DAST-10 reached the criterion of an Eigenvalue greater than one (4.71 and 1.12) and the variance accounted for these components was 47.5% and 11.24%, respectively. The unidimensionality of the scale then was assessed subsequently with CFA. Estimation of the model produced a good fit (χ^2/df = 34.507/29 = 1.19; RMSEA = 0.031, GFI = 0.966, adjusted GFI = 0.936, parsimony GFI = 0.509, NFI = 0.958, CFI = 0.993, IFI = 0.993). As seen in Table 2, all item-component loadings were in the "good" to "excellent" range. Thus, results from the PCA and the CFA suggest that the DAST-10 assesses a unidimensional construct.

Convergent Validity and Internal Consistency Reliability

The Pearson product–moment correlation between the DUDIT and DAST-10 scores for all participants (n = 202) was high (r = 0.86, p < 0.001). Correlations between DUDIT and API-S (r = 0.88, p < 0.001), characteristics of substance use (r = 0.77, p < 0.001), dependency diagnosis (r = 0.86, p < 0.001), the effects of substance use on the user (r = 0.87, p < 0.001), craving (r = 0.53, p < 0.001), and motivation to quit using substances (r = 0.52, p < 0.001) were moderate to high. Correlations between DAST-10 and API-S (r = 0.84, p < 0.001), characteristics of substance use (r = 0.73, p < 0.001), dependency diagnosis (r = 0.81, p < 0.001), the effects of substance use on the user (r = 0.82, p < 0.001), craving (r = 0.51, p < 0.001), and motivation to quit using substances (r = 0.51, p < 0.001) were also moderate to high.

Internal consistency for the DUDIT (coefficient α = 0.93) and for the DAST-10 (coefficient α = 0.87), examined by Cronbach's alpa, was also high (Table 2). Interitem and item-total correlations for the DUDIT and the DAST-10 are shown in Table 3.

Predictive Validity, Sensitivity, Specificity, and Optimal Cut-Off Scores

The DUDIT's and the DAST-10's predictive validity, sensitivity, and specificity were examined using a ROC

TABLE 3
Inter-Item and Item-Total Correlations for Total Sample (n = 202)

	1	2	3	4	5	6	7	8	9	10	11	DAST-10
1		0.44	0.57	0.36	0.41	0.51	0.41	0.52	0.52	0.27		0.73
2	0.55		0.71	0.44	0.27	0.31	0.37	0.35	0.36	0.29		0.67
3	0.75	0.58		0.38	0.29	0.31	0.43	0.37	0.45	0.29		0.71
4	0.50	0.56	0.59		0.33	0.40	0.39	0.37	0.40	0.31		0.64
5	0.49	0.58	0.47	0.55		0.54	0.54	0.40	0.43	0.26		0.66
6	0.47	0.67	0.54	0.59	0.72		0.58	0.51	0.44	0.32		0.72
7	0.52	0.58	0.56	0.54	0.60	0.63		0.48	0.53	0.40		0.75
8	0.67	0.61	0.72	0.55	0.53	0.62	0.58		0.44	0.23		0.69
9	0.47	0.39	0.47	0.42	0.51	0.43	0.49	0.44		0.42		0.73
10	0.50	0.56	0.57	0.48	0.49	0.59	0.57	0.56	0.51			0.54
11	0.53	0.43	0.47	0.43	0.46	0.47	0.52	0.48	0.41	0.64		
DUDIT	0.77	0.78	0.80	0.74	0.77	0.80	0.79	0.81	0.66	0.77	0.70	

For all correlations $p < 0.001$.

curve that included all participants (n = 202). Participants were dichotomously classified according to SCID-I interview as group with drug use disorder or group without drug use disorder. In the graph of sensitivity and 1-specificity (false positivity) values, as much as the curve approaches the left corner or the area under the curve approaches a value of 1.0 indicates that the test can discriminate between the two groups.

Results for the DUDIT revealed that the area under curve (AUC) (0.952- Std. Error = 0.014) was in the "excellent" range and that a score of 10 was the most critical value for identifying a participant as having a drug problem. This cut-off score corresponds to sensitivity = 0.95, specificity = 0.79, Kappa = 0.77, positive predictive power (PPP) = 0.88, and negative predictive power (NPP) = 0.91. Table 4 shows the comparison of PD and PWD according to cut-off point 10 on the DUDIT and the mean scores of the DUDIT.

Results for the DAST-10 revealed that the AUC (0.897- Std. Error = 0.023) was in the "excellent" range and that a score of 4 was the most critical value for identifying a participant as having a drug problem. This cut-off score corresponds to sensitivity = 0.88, specificity = 0.74, Kappa = 0.63, PPP = 0.85, and NPP = 0.80. Table 4 shows the comparison of PD and PWD according to cut-off point 4 on the DAST-10 and the mean scores of the DAST-10.

These results shows that the cut-off scores of the DUDIT and the DAST-10 might be able to discriminate between the prisoners diagnosed with drug use disorder and prisoners without drug use disorder.

Discriminant Validity

To evaluate discriminant validity, a Student's t test was conducted. Mean scores of the DUDIT and the DAST-10 were compared according to the participants' group membership (PD and PWD). The mean scores of the DUDIT (t = -18.03, $p < 0.001$) and the DAST (t = -13.47, $p < 0.001$) were statistically higher in the PD group than the PWD group (Table 4).

DISCUSSION

Both the DUDIT (Berman et al. 2005) and the DAST-10 (Skinner 1982) were developed to identify individuals in the general public who may have a drug problem, as well as individuals in clinical settings who are likely to meet criteria for a substance dependence diagnosis. The present study established the psychometric properties of the DUDIT and the DAST-10 in prisoners with or without drug use disorder in Turkey.

Overall, both the DUDIT and the DAST-10 were found to have satisfactory psychometric characteristics as a drug abuse screening test. Consistent with a previous study (Voluse et al. 2012), high correlation between the DUDIT and the DAST-10 indicated good convergent validity (r = 0.86). Both the DUDIT and the DAST-10 also showed good discriminant validity, as evidenced by their ability to differentiate persons with drug use disorders from those without. The Turkish version of the DUDIT (Cronbach's $\alpha = 0.93$) and the DAST-10 (Cronbach's $\alpha = 0.87$) had high internal consistency reliability. Finally, PCA for the DUDIT and the DAST-10 produced a unidimensional construct, with a single component accounting for 58.28% and 47.10% of the total variance, respectively. Confirmatory Factor Analyses provided further support for the unidimensional structures of the DUDIT and the DAST-10. The ROC curve showed that the DUDIT and the DAST-10 had good predictive validity as suggested by high sensitivity, specificity, and the AUC.

Our results revealed that cut-off scores of 10 for the DUDIT and 4 for the DAST-10 were the most critical

TABLE 4
Drug Use Disorder Status According to the Cut-Off Point 10 for DUDIT and the Cut-Off Point 4 for DAST-10

		No Drug Use Disorder		Drug Use Disorder			P
DUDIT	Negative (n = 68)	62	79.5	6	4.8	$\chi 2 = 119.48$	<0.001
(cut-off = 10)	Positive (n = 134)	16	20.5	118	95.2		
	mean ± sd	5.09 ± 7.73		27.62 ± 9.93		**t** = −18.03	<0.001
DAST-10	Negative (n = 73)	58	74.4	15	12.1	$\chi 2 = 80.43$	<0.001
(cut-off = 4)	Positive (n = 129)	20	25.6	109	87.9		
	mean ± sd	1.89 ± 2.52		6.61 ± 2.37		**t** = −13.47	<0.001

values for identifying participants who have a drug use disorder according to the SCID-I. Berman et al. (2005a; 2005b) recommended use of the scores of 6 for males and 2 for females as a cut-off point in DUDIT to identify drug-related problems in general populations, whereas scores greater than 25 are recommended as a cut-off point in clinical populations. Including less severe patients in their study, Voluse et al. (2012) suggested a cut-off point of 8 in their clinical sample. Finally, Durbeej et al. (2010) suggested that cut-off scores should be applied with caution for the DUDIT due to the discrepancy between studies. One reason for this discrepancy may be that these studies were conducted among different populations in different countries. It seems that when the population is more homogeneous, such as clinical populations with higher severity of drug dependency, then the cut-off score of the DUDIT is higher. Thus, the cut-off scores for the scale should be repeatedly evaluated in different general and clinical populations. Previous studies (Cocco & Carey 1998; Carey et al. 2003; McCabe et al. 2006) suggested 3 as a cut-off point score for the DAST-10 because, according to their data, this has shown the best balance between sensitivity and specificity, whereas the cut-off score of 4 identified in the present study was consistent with the Spanish version of the scale (Bedregal et al. 2006).

The DUDIT and the DAST-10 have good psychometric characteristics. Since they are brief, not substance specific, and inquire about use and consequences within the past 12 months, consistent with the DSM-IV-TR interval criterion for diagnosis, they also have an advantage over other drug abuse screening instruments. In conclusion, the present study extended the evaluation of the psychometric properties of the DUDIT and the DAST-10 to prisoners with and without drug use disorders, supported the unidimensional construct of the DUDIT and the DAST-10 with confirmatory analysis in Turkey, and replicated the findings of the previous studies, which were mainly conducted in clinical settings. This and previous studies support the use of the DUDIT and the DAST-10 in various clinical settings and in the prison setting and encourage continued research into their use.

REFERENCES

Bakken, K. & Vaglum, P. 2007. Predictors of suicide attempters in substance-dependent patients: A six-year prospective follow-up. *Clinical Practice and Epidemiology in Mental Health* 3: 20.

Bakken, K.; Landheim, A. & Vaglum, P. 2007. Axis I and II disorders as long-term predictors of mental distress: A six-year prospective follow-up of substance dependent patients. *BMC Psychiatry* 7: 29.

Bedregal, L.E.; Sobell, L.C.; Sobell, M.B. & Simco, E. 2006. Psychometric characteristics of a Spanish version of the DAST-10 and the RAGS. *Addictive Behaviours* 31: 309–19.

Berman, A.H.; Bergman, H.; Palmstierna, T. & Schlyter F. 2005a. Evaluation of the Drug Use Disorders Identification Test (DUDIT) in criminal justice and detoxification settings and in a Swedish population sample. *European Addiction Research* 11: 22–31.

Berman, A.H.; Bergman, H.; Palmstierna, T. & Schlyter F. 2005b. *Drug Use Disorders Identification Test Manual*. Stockholm, Sweden: Karolinska Institutet.

Berman, A.H.; Källmén, H.; Barredal, E. & Lindqvist, P. 2008. Hopeless patients? A study of illicit opiate users who drop out from in-patient detoxification. *Journal of Substance Use* 13: 121–30.

Brown, R. & Rounds, L. 1995. Conjoint screening questionnaires for alcohol and other drug abuse: Criterion validity in a primary care practice. *WMJ* 94: 135–40.

Byrne, B.M. 2010. *Structural Equation Modeling with AMOS: Basic Concepts, Applications and Programming*, 2nd ed. New York: Taylor & Francis.

Carey, K.B.; Carey, M.P. & Chandram, P.S. 2003. Psychometric evaluation of the alcohol use disorders identification test and short drug abuse screening test with psychiatric patients in India. *Journal of Clinical Psychiatry* 64: 767–74.

Cocco, K.M. & Carey, K.B. 1998. Psychometric properties of the Drug Abuse Screening Test in psychiatric outpatients. *Psychological Assessment* 10: 408–14.

Corapcıoglu, A.; Aydemir, O.; Yildiz, M.; Esen, A. & Koroglu, E. 1999. *DSM-IV Eksen I Bozuklukları (SCID-I) için Yapılandırılmış Klinik Görüşme, Klinik Versiyon*. Ankara, Turkey: Hekimler Yayın Birliği (in Turkish).

Coskunol, H.; Bagdiken, I.; Sorias, S. & Saygili, R. 1995. Validity and reliability of the Michigan Alcoholism Screening Test (Turkish version). *Ege Tip Dergisi* 34: 15-8 (in Turkish).

Cruce, G. & Ojehagen, A. 2007. Risky use of alcohol, drugs, and cigarettes in a psychosis unit: A 1 1/2 year follow-up of stability and changes after initial screening. *BMC Psychiatry* 7: 31.

Cruce, G.; Nordstrom, L.G. & Ojehagen, A. 2007. Risky use and misuse of alcohol, drugs, and cigarettes detected by screening questionnaires in a clinical psychosis unit. *Nordic Journal of Psychiatry* 61: 92–9.

Durbeej, N.; Berman, A.H.; Gumpert, C.H.; Palmstierna, T.; Kristiansson, M. & Alm, C. 2010. Validation of the Alcohol Use Disorders Identification Test and the Drug Use Disorders Identification Test in a Swedish sample of suspected offenders with signs of mental health problems: Results from the Mental Disorder, Substance Abuse and Crime study. *Journal of Substance Abuse Treatment* 39: 364–77.

First, M.B.; Spitzer, R.L.; Gibbon, M. & Williams, J.B.W. 1997. *Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I), Clinical Version*. Washington, DC: American Psychiatric Press, Inc.

Gavin, D.R.; Ross, H.E. & Skinner, H.A. 1989. Diagnostic validity of the Drug Abuse Screening Test in the assessment of the DSM III drug disorders. *British Journal of Addiction* 84: 301–07.

Gibbs, L.E. 1985. Validity and reliability of the Michigan Alcoholism Screening Test: A review. *Drug and Alcohol Dependence* 12: 279–85.

Hair, J.F.; Anderson, R.E.; Tatham, R.L. & Black, W.C. 2010. *Multivariate Data Analysis*, 7th ed. Englewood Cliffs, NJ: Prentice-Hall.

Hodgins, S.; Alderton, J.; Cree, A.; Aboud, A. & Mak T. 2007. Aggressive behaviour, victimization, and crime among severely mentally ill patients requiring hospitalisation. *British Journal of Psychiatry* 191: 343–50.

Hodgins, S.; Cree, A.; Alderton, J. & Mak T. 2008. From conduct disorder to severe mental illness: Associations with aggressive behaviour, crime, and victimization. *Psychological Medicine* 38: 975–87.

Kaloyanides, K.B.; McCabe, S.E.; Cranford, J.A. & Teter, C.J. 2007. Prevalence of illicit use and abuse of prescription stimulants, alcohol, and other drugs among college students: Relationship with age at initiation of prescription stimulants. *Pharmacotherapy* 27: 666–74.

Landheim, A.S.; Bakken, K. & Vaglum P. 2006. Impact of comorbid psychiatric disorders on the outcome of substance abusers: A six year prospective follow-up in two Norwegian counties. *BMC Psychiatry* 6: 44.

Maisto, S.A.; Carey, M.P.; Carey, K.B.; Gordon, C.M. & Gleason, J.R. 2000. Use of the AUDIT and the DAST-10 to identify alcohol and drug use disorders among adults with a severe and persistent mental illness. *Psychological Assessment* 12: 186–92.

McCabe, S.E.; Boyd, C.J.; Cranford, J.A.; Morales, M. & Slayden, J. 2006. A modified version of the Drug Abuse Screening Test among undergraduate students. *Journal of Substance Abuse Treatment* 31: 297–303.

McLellan, A.T.; Luborsky, L.; Woody, G.E. & O'Brien, C.P. 1980. An improved diagnostic evaluation instrument for substance abuse patients: The Addiction Severity Index. *The Journal of Nervous and Mental Disease* 168: 26–33.

Mdege, N.D. & Lang, J. 2011. Screening instruments for detecting illicit drug use/abuse that could be useful in general hospital wards: A systematic review. *Addictive Behaviour* 36: 1111–1119.

Nesvag, R.; Lange, E.H.; Faerden, A.; Barrett, E.A.; Emilsson, B.; Ringen, P.A.; Andreassen, O.A.; Melle, I. & Agartz, I. 2010. The use of screening instruments for detecting alcohol and other drug use disorders in first-episode psychosis. *Psychiatry Research* 177: 228–234.

Ogel, K.; Başabak, A.; Koc, C.; Aksoy, A. & Karadayı, G. 2011. Psychometric properties of different forms of the Addiction Profile Index (BAPI). *Bulletin of Clinical Psychopharmacology* 21(Suppl.2): 151.

Ogel, K.; Evren, C.; Karadag, F. & Gurol, D.T. 2012. The development, validity, and reliability of the Addiction Profile Index (API). *Turk Psikiyatri Dergisi* 23: 264–73.

Saatcioglu, O.; Evren, C. & Cakmak, D. 2002. Reliability and validity of the Alcohol Use Disorders Identification Test. *Psychiatry in Turkiye* 4: 107–13 (in Turkish).

Saunders, J.; Aasland, O.; Babor, T.; de la Fuente, J. & Grant M. 1993. Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption-II. *Addiction* 88: 791–804.

Skinner, H. 1982. The Drug Abuse Screening Test. *Addictive Behaviour* 7: 363–71.

Skinner, H.A. & Goldberg, A.E. 1986. Evidence for a drug dependence syndrome among narcotic users. *British Journal of Addiction* 81: 471–84.

Stephens, T., McGee, W., & Braithwaite, R.L. 2007. Age-based correlates of substance misuse among convicted felons in Georgia. *American Journal of Drug & Alcohol Abuse* 33: 885–92.

Voluse, A.C.; Gioia, C.J.; Sobell, L.C.; Dum, M.; Sobell, M.B. & Simco, E.R. 2012. Psychometric properties of the Drug Use Disorders Identification Test (DUDIT) with substance abusers in outpatient and residential treatment. *Addictive Behaviour* 37: 36–41.

Yudko, E., Lozhkina, O. & Fouts, A. 2007. A comprehensive review of the psychometric properties of the Drug Abuse Screening Test. *Journal of Substance Abuse Treatment* 32: 189–98.