

The Development, Validity, and Reliability of the Addiction Profile Index (API)



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SUMMARY

Objective: The objective of this study was to develop a practical questionnaire for multidimensional assessment of problems associated with alcohol and substance abuse that would also be useful for treatment planning.

Materials and Methods: The Addiction Profile Index (API) is a self-report questionnaire consisting of 37 items and the following 5 subscales: characteristics of substance use; dependency diagnosis; the effects of substance use on the user; craving; motivation to quit using substances. The study included 345 alcohol and/or substance abusers from 2 addiction treatment clinics and a prison addiction service. The validity of the questionnaire was assessed using the Michigan Alcoholism Screening Test (MAST), Readiness to Change Questionnaire (SOCRATES), Penn Alcohol Craving Scale (PACS), Drug Craving Scale (DCS), Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I), and Addiction Severity Index (ASI).

Results: The Cronbach's alpha coefficient for the total API was 0.89 and for the subscales it ranged from 0.63 to 0.86. Item-total correlation coefficients ranged from 0.42 to 0.89. The Spearman Brown split-half method coefficient for the total API was 0.83. In all, 4 factors were obtained using explanatory factor analysis that represented 52.3% of the total variance. The API craving subscale was observed to be consistent with PACS and the API motivation subscale was consistent with SOCRATES. The API total score was strongly correlated with the mean MAST score, and the composite ASI medical status, substance use, legal status, and family social relations subscale scores. Based on ROC analyses, the area under curve was 0.90. With a total API cut-off score of 4, the scale's sensitivity and specificity 0.85 was 0.78, respectively.

Conclusion: The findings show that the API is a valid and reliable questionnaire that can be used to measure the severity of different dimensions of substance dependency.

Keywords: Alcohol, substances, addiction, validity, reliability

INTRODUCTION

Addiction is a chronic disease with a relapsing course; therefore, long-term treatment and follow-up strategies should be developed (Dennis et al. 2005; Dennis and Scott 2007). At present, in studies on substance use addiction is classified generally and categorically as yes or no, according to diagnostic criteria; therefore, dimensional evaluation of the problems associated with substance use is lacking (Conway et al. 2010). Patients with alcohol and substance use disorders have multidimensional problems (Ögel 2010). Hence, in alcohol and substance use disorders, different dimensions of addiction

should be taken into account in planning treatment (NIDA 2009). For instance, the type of substance used, the duration of substance use, and the amount of substance used are important factors in planning treatment (Connors 1995).

The diagnosis of dependency changes the mode of treatment in people with alcohol and substance use disorders (Leshner 1997). For example, in those diagnosed with dependency treatment is generally directed towards abstinence, while in other cases treatment is usually in the form of controlled use. As such, the diagnosis of addiction is an important factor in determining the most appropriate treatment method. Severe

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craving for substance use is a factor that makes treatment compliance difficult for those with alcohol and substance use disorders (Anton et al. 1999; Bottlender and Soyka 2004). It was reported that relapse is frequent in those with severe craving for substance use (LoCastro et al. 2008) and that it is useful to administer different treatment methods and to plan treatment accordingly (NIAAA 2001; Oslin et al. 2009).

Motivational interviewing is one of the most effective methods in the management of alcohol and substance use disorders. The technique is critically important, as many alcohol and substance users are not motivated for treatment (Rubak et al. 2005). Thus, it has been established that determination of the level of motivation for treatment and increasing the level can increase the likelihood of treatment success (Ryan et al. 1995; DiClemente et al. 1999; Magill et al. 2010). Determination of the factors that cause alcohol and substance use disorders is beneficial for preventing relapse; therefore, such factors as impaired anger control (Reilly et al. 2002), high-level anxiety, inadequate stress-coping skills (Sinha 2007), lack of assertiveness (Lindquist et al. 1979; Mooney and Corcoran 1989,) and depression (Brown et al. 1998; Dodge et al. 2005) should be considered when contemplating strategies for preventing relapse (Marlatt et al. 1999).

The severity of addiction is a major criterion to be used when choosing a treatment method. In individuals with a high degree of dependence, more intensive treatment should be offered (Yancar 2005). The severity of dependence depends on numerous factors; each variable, such as the number of symptoms forming the diagnostic criteria of dependence, the impact of substance use on the user's everyday life (psycho-social effect), and the severity of craving for substance use, may be regarded as indicators of the severity of dependence. As such, it is important to define and measure the severity of dependence (Saxon et al. 1996).

Commonly used scales for evaluating the severity of dependence include the Addiction Severity Index (ASI) (McLellan et al. 2003), the Severity of Dependence Scale, which evaluates only opiate use (SDS) (Ferri et al. 2000), the Addiction Severity Assessment Tool (ASAT) (Butler et al. 2006), and the Michigan Alcoholism Screening Test (MAST) (Ross et al. 1990). Of these scales, only the ASI and MAST have been reported to be valid and reliable for use in Turkey. To date, the majority of available scales attempt to evaluate the various dimensions of dependence, including DSM criteria, problems caused by substance use, and the characteristics of substance use; however, there is no single scale that includes all dimensions of the severity of dependency. The severity of dependence and problems related to dependency are not usually considered multidimensionally. It was reported that individual differences couldn't be evaluated using the available scales (Conway et al. 2010). The necessity of measuring different dimensions of addiction and the development of new

scales has been reported (Vanyukov et al. 2003). As such, the aim of the present study was to develop a scale to multidimensionally evaluate substance use characteristics, problems related to substance use, and the severity of addiction in those with alcohol and substance use disorders, and for aiding the development of appropriate treatment plans.

MATERIALS and METHODS

Development of the scale

Following a search of the literature, relevant studies were reviewed. Five main domains of the addiction profile were determined, based on the domains suggested in previous studies and the researchers' clinical experience, as follows:

1. Characteristics of an individual's alcohol/drug use (substances used and the frequency of use);
2. Diagnostic criteria of addiction;
3. The effect of substance use on the user's everyday life;
4. Severe craving for substance use;
5. Motivation to quit substance use.

For each domain a separate question pool was prepared, so as to define the above-mentioned domains. Prior to preparation of the question pool, 5 patients with alcohol dependence and 5 patients with substance dependence were interviewed. Taking into consideration the language the patients used and the problems they reported in each domain, questions were formulated by the investigators. For the diagnostic criteria domain DSM-IV criteria were also taken into account (American Psychiatric Association 1994). From among the similar questions, those thought to best represent the problem and to be suitable for use in the scale were chosen. Accordingly, a question pool containing 53 questions was formed.

Questions were organized into a self-report scale. Questions relevant to the characteristics of substance use were developed to include alcohol and other drugs, and a 5-point Likert-type scale for answers (never, only 1-2 times, 1-3 times monthly, 1-5 times weekly, and almost every day). The subscales also use a 5-point Likert-type scale, varying between never and almost always. The developed question form was administered to 10 alcohol and 10 substance users. Each question is discussed and the opinions and feedback of the interviewers were taken. In accordance with the feedback, the questions were revised and those that were not understood by the patients were excluded from the form. The questions were then reviewed by 5 experienced experts; the question form reached its final form based on their feedback. Thus, surface validity was achieved. The Cronbach's alpha coefficient for the scale's 43 items was 0.81 and for the 5 subscales it ranged between 0.53-0.80. We decided to exclude 6 items with a reliability

coefficient <0.3 (presence of previous treatment, substance use in the majority of friends, duration of time substance use was a problem, considering the importance of decreasing substance use, self-confidence to quit, and thinking that life would be difficult without substance use). Thus, the final Addiction Profile Index (API) included 37 questions and 5 subscales.

The substance use characteristics subscale includes 12 questions regarding the type of substances used and the frequency of use. The diagnostic criteria subscale includes 8 questions, the psychosocial effect of substance use subscale 10, the craving subscale, 4 and the motivation to quit subscale 3 questions. The craving and motivation subscale questions are relevant to the previous last week, whereas the other subscales evaluate the previous year.

Sample

The study included participants from following 3 clinical settings.

1. 100 patients with an alcohol use disorder and 98 with a substance use disorder that underwent treatment as inpatients at Bakırköy Research and Training Hospital for Psychiatry, Neurology and Neurosurgery, AMATEM Clinic between October and December 2010.
2. 21 patients with an alcohol and/or substance use disorder that were inpatients or outpatients at Maltepe University, School of Medicine, Psychiatry Clinic between October and December 2010. The Addiction Severity Index (ASI), which is explained in the instruments section, must be used by specially trained personnel and its administration is time consuming. Due to the presence of a staff member with special training in use of the ASI, patients from Maltepe University Psychiatry Clinic was included in the sample.
3. 126 alcohol and other substance users selected randomly from 11 wards of Ümraniye Prison were included in the study. Ümraniye Prison is an institution that houses many substance users. Patients from the prison were included in the study, in part, because a sizable proportion of alcohol/substance users are imprisoned. Any scale developed to evaluate substance dependence should be applicable to the imprisoned population as well. Additionally, we included these inmates because of the need to include substance users that have not yet been diagnosed with substance abuse or dependence, so as to evaluate the scale's diagnostic subscale. As all the patients treated at Bakırköy Training and Research Hospital for Psychiatry, Neurology, and Neurosurgery AMATEM Clinic and at the Maltepe University School of Medicine, Psychiatry Clinic were expected to be dependent, a sample from the prison

population representing substance users that were not dependent was chosen for inclusion.

Instruments

Four different scales were used to determine the reliability and diagnostic validity of API.

Michigan Alcoholism Screening Test (MAST): This scale is used to determine if an individual has problems related to alcohol use, and if so to measure their severity. It can be administered to individuals that present to primary healthcare providers and to those that think they have problems associated with alcohol dependency. The scale was developed by Gibbs (1985), and was reported to be reliable and valid for use in Turkey by Coşkunol et al. (1995).

Penn Alcohol Craving Scale (PACS) and Substance Craving scale (SCS): Craving for substance use was evaluated using PACS. PACS is a 5-item questionnaire developed to evaluate the desire for alcohol use during the previous week (frequency, severity, duration, resistance, and general craving) (Flannery et al. 1999). Each item is scored between 0 and 6, and the maximum craving score is 30. Evren et al. (2008) reported that the Turkish version was valid and reliable for use with male alcohol-dependent inpatients in Turkey. SCS is the version of the scale for evaluating other than alcohol drug dependence and its overall Cronbach's alpha value is 0.84. The overall item-total correlation values corrected for each item varies between 0.75 and 0.82 (Evren et al. 2011a).

The Stages of Change Readiness and Treatment Eagerness Scale (SOCRATES): SOCRATES is a 19-item self-report questionnaire developed by Miller and Tonigan (1996) for evaluating the level of readiness for change and motivation to change in individuals with an alcohol use disorder. Factor analysis of the original scale indicated that the form measures 3 domains: recognition, ambivalence, and taking steps. The factorial structure of the 16-item Turkish version was reported to be compatible with the original version of the scale. Measurement of the internal consistency of the Turkish version of the scale showed that Cronbach's alpha coefficients were 0.77 for the recognition domain, 0.74 for ambivalence domain, and 0.78 for the taking steps domain, and 0.85 for the total scale in individuals with alcohol dependence (Evren et al. 2008). When its 16-item Turkish version, which was reported to be valid and reliable in Turkish alcohol-dependent individuals, was administered to drug-dependent individuals its Cronbach's alpha value was 0.84 for the total scale (Evren et al. 2011b).

Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I): SCID-I is a structured interview form developed by First et al. (1997) for diagnosing DSM-IV-TR Axis I disorders. In the present study the clinical version of SCID-I was

used. SCID-I was translated into Turkish and its reliability and validity were reported by Çorapçıoğlu et al. (1999).

Addiction Severity Index (ASI): ASI is a 140-item semi-structured clinical measurement tool developed by McLellan et al. (1992) to measure the severity of addiction, to evaluate the degree of need for consultation and treatment of alcohol and substance use disorders, and to evaluate the health effects of alcohol or substance use, employment and support, drug and alcohol use, legal status, family/social relationships, psychiatric problems, and the need for any relevant treatment. The scale includes 6 subscales: medical status (11 items), employment and support status (24 items), legal status (30 items), alcohol and substance use (27 items), family and social status (26 items), and psychiatric status (22 items). The severity of the problem measured by each subscale is scored by the interviewer as 0-9. The reliability and validity of the Turkish version was reported by Demirbaş et al. (2003).

Process

All the participants were given information about the study protocol, and then they provided written informed consent. The participants completed the API by themselves and were divided into 2 groups according to their scores: the alcohol user group and other substance user group. Those in the alcohol user group were administered alcohol-related forms (SOCRATES, PACS and MAST), whereas those in the other substance user group were administered the other substance-related forms (SOCRATES, SAS, and MAST). ASI was administered only to patients from Maltepe University, School of Medicine, Psychiatry Clinic. As the levels of motivation and craving can change rapidly (Vukovic et al. 2008), and the questionnaires used in the study measure these parameters during the previous week only, test-retest was not performed to evaluate reliability. The participants did not write their names on the forms, but those that were administered SCID-I did. SCID-I was administered by 3 clinical psychologists trained in its use. SCID-I was only administered to selected participants from Ümraniye Prison.

Statistical analysis

The API subscales consist of the sum of the scores of questions in relevant subscales. The substance use characteristics subscale score was calculated by the addition of the score for the question about problematic use of the substance and the mean score of the 11 questions about the substances used and the frequency of their use. The mean of the score for the 2 questions about drug tolerance was used for analysis; the same procedure was repeated for the 2 questions about substance withdrawal. API total score was calculated as the sum of the mean subscale scores.

The substance use characteristics subscale was not included in reliability or factor analysis. The substance use characteristics subscale investigates substances that cause dependency and the frequency of their use. As the type of substance used is not directly related to any diagnosis, the effect of dependency on everyday life, craving, or motivation, it was not evaluated within the general framework of API; however, as the severity of addiction is related to the frequency of substance use, the substance use characteristics subscale score was added to that of other subscales for evaluating the severity of dependency.

For reliability analysis Cronbach's alpha coefficient was calculated, and split half correlations were determined via Spearman Brown and Guttman coefficients. The factor structure of API was investigated using explanatory factor analysis and varimax rotation. These analyses included the entire study sample. Pearson's correlation analysis was used to analyze the reliability of API. In order to determine the sensitivity and specificity of the addiction subscale diagnoses, ROC curve and calculation of the area remaining under curve was used. The control group for ROC curve calculation was chosen from among the participants not diagnosed with an addiction according to SCID-1. All statistical analyses were performed using SPSS v.17.0.

RESULTS

The sociodemographic characteristics of the study sample are shown in Table 1.

Reliability analysis

When reliability analysis of API was performed after excluding the first 6 items, Cronbach's alpha coefficient was 0.89 for the total scale, and between 0.63 and 0.86 for the subscales. Correlation coefficients for item-total scores were between 0.42 and 0.89, and those for subscale-total scores were

TABLE 1. Sociodemographic characteristics and treatment status of the study group

	n = 345	%
Mean ± SD Age (years)	34.28 ± 10.34	
Sex		
Male	319	92.4
Female	26	7.6
Marital Status		
Married	136	39.4
Single/divorced	209	60.6
Level of Education		
Literate/primary school	230	66.6
Secondary school	79	22.9
High School	32	9.3
University	4	1.2
Previous psychiatric/psychological treatment		
Yes	101	29.3
No	244	70.7

TABLE 2. API subscale reliability coefficients

	Mean of Scale if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Cronbach's Alpha Coefficient if Item Deleted	Cronbach's Alpha Coefficient	Spearman Brown Coefficient	Guttman coefficient
Diagnostic criteria					.71	.69	.69
Tolerance	18.29	14.96	.45	.67			
Abstinence	18.13	13.56	.50	.65			
Difficulty with control	17.90	13.91	.45	.67			
Frequent attempts to quit	18.20	14.30	.44	.70			
Spending too much time to use	18.25	12.92	.49	.65			
Giving up other activities	17.91	13.90	.43	.67			
Psychosocial effect					.86	.83	.83
Family relationship problems	32.74	51.39	.65	.85			
Career/educational problems	32.83	49.20	.69	.84			
Problems with physical health	33.13	51.76	.54	.85			
Psychological problems	33.00	50.13	.66	.84			
Economic problems	32.66	52.72	.53	.85			
Relationship with friends and neighbors problematic	32.98	50.29	.69	.84			
Getting into trouble with substance use	34.10	48.52	.61	.85			
Legal problems	34.35	50.41	.54	.85			
Using substance during daytime	32.67	54.49	.42	.86			
Family or neighbors are worried about you	32.72	53.42	.48	.86			
Craving					.77	.79	.79
Using substance when you don't want to	11.09	7.82	.53	.74			
Thinking about substance use	10.85	7.6	.62	.69			
Strong desire to use substance	10.86	7.30	.72	.65			
Low resistance to substance use	11.16	7.31	.46	.79			
Motivation					.63	.61	.41
Considering substance use is a problem	9.31	1.32	.45	.55			
Considering quitting or decreasing use	9.08	1.67	.48	.47			
Importance of quitting or decreasing use	8.85	2.17	.44	.56			

between 0.47 and 0.86. In terms of split-half correlations, the Spearman Brown coefficient was 0.83 and the Guttman coefficient was 0.82 (Table 2).

Validity analysis

Explanatory factor analysis was performed using varimax rotation and the main components method. In explanatory factor analysis 4 factors with an Eigen value >1 were obtained that explained 52.39% of the overall variance (Table 3). All items were included in a factor with factor weights >0.30.

Questions were generally distributed among the factors as expected. The 1st factor was the effect of substance use on everyday life, the 2nd factor was craving substance use, the 3rd factor was diagnostic criteria of dependence, and the 4th factor was motivation to quit.

In explanatory factor analysis of subscale total scores, only 1 factor with an Eigen value >1 was observed and it explained 50.7% of all variance. Factor loadings were 0.85 for diagnostic criteria, 0.84 for the effect on everyday life, 0.74 for

TABLE 3. Explanatory factor structure of API

	1. Factor Load	2. Factor Load	3. Factor Load	4. Factor Load
Family relationship problems	.742			
Relationships with friends and neighbors problematic	.732			
Psychological problems	.729			
Career/educational problems	.676			
Getting into trouble with substance use	.676			
Legal problems	.672			
Problem with physical health	.622			
Giving up other activities	.577			
Substance use during daytime	.512			
Economic problems	.461			
Family and neighbors are worried about you	.372			
Craving substance use		.871		
Thinking about substance use		.832		
Using substance when you don't want to		.619		
Low resistance to substance use		.520		
Frequent attempts to quit			.683	
Spending too much time to use			.642	
Tolerance			.590	
Abstinence			.494	
Difficulty controlling substance use			.413	
Importance of quitting or decreasing use				.769
Considering quitting or decreasing use				.767
Problems associated with substance use				.710

craving, 0.64 for substance use characteristics, and 0.47 for motivation to quit.

Correlations between subscales

The correlations between all the subscale scores, and between the subscale scores and total score were statistically significant; however, correlations between the motivation subscale and the other subscales were weak, and its correlation with the substance use characteristics subscale was not significant (Table 4).

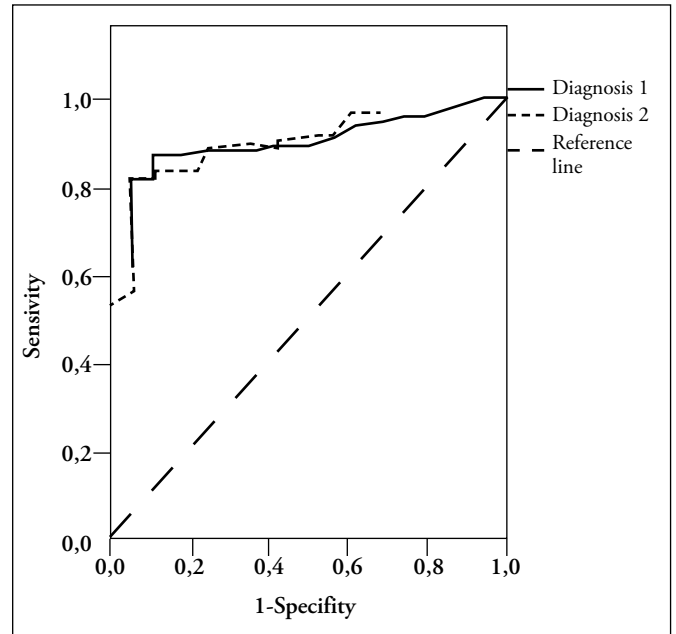


Figure. ROC curves for API scores in those diagnosed with dependence via SCID-1 and in those not diagnosed.

Note:

Diagnosis 1: When the diagnosis subscale was evaluated for 6 API items.

Diagnosis 2: When the diagnosis subscale was evaluated for 5 API items.

Correlations with other scales

Among the alcohol and drug users, significant correlations were observed between the SOCRATES mean score and the API motivation subscale score, and between PACS and SAS mean scores, and the API craving subscale score. When alcohol and other substance users were analyzed separately the correlation between the API craving subscale and PACS/SAS, and between the API motivation subscale and SOCRATES was significant for each group (Table 4).

Weighted MAST mean score and API total score were strongly correlated in both the alcohol users and other substance users ($P < 0.001$). Among the alcohol and drug users, the correlation between the weighted mean MAST score and all API subscale scores, except for the motivation subscale, was significant. MAST score had a stronger correlation with the API effect on everyday life subscale, which was striking (Table 5). The composite ASI score of the medical status, drug use, legal status, and family/social relationships subscales, and API total score was correlated, whereas the ASI employment, alcohol use, and psychiatric status subscales were not (Table 5).

ROC analysis

In order to test the reliability of the API diagnosis of dependence subscale its specificity and sensitivity were evaluated via ROC analysis. The alcohol and other substance users were analyzed together, and the ROC curve that was obtained is shown in the Figure. When the API diagnosis subscale was

TABLE 4. Mean $\pm$ SD correlation coefficients between the SOCRATES, MAST, PACS, and ASI scores, and API total and subscale scores.

	Mean $\pm$ SD	API subscales				
		Substance use characteristics	Diagnosis	Effect on everyday life	Craving	Motivation
Substance use characteristics	4.77 $\pm$ 1.48	-				
Diagnostic criteria	21.74 $\pm$ 4.35	.45*	-			
Effect on everyday life	36.80 $\pm$ 7.89	.44*	.62*	-		
Craving	14.65 $\pm$ 3.52	.28*	.52*	.52*	-	
Motivation	13.62 $\pm$ 1.80	.03	.27*	.23*	.16*	-
API total	17.89 $\pm$ 2.64	.64*	.82*	.82*	.75*	.43*
SOCRATES (total)	68.21 $\pm$ 10.05	-	-	-	-	.34*
SOCRATES (alcohol)	67.03 $\pm$ 10.97	-	-	-	-	.30*
SOCRATES (substance)	69.37 $\pm$ 8.98	-	-	-	-	.41*
PENN (general)	12.51 $\pm$ 7.73	-	-	-	.44*	-
PACS (alcohol)	9.92 $\pm$ 7.25	-	-	-	.41*	-
MAÖ (drug)	15.15 $\pm$ 7.37	-	-	-	.46*	-

*P < 0.01

**P < 0.001

TABLE 5. Correlation coefficients between MAST and ASI scales, and total API score

	Mean $\pm$ SD	API Total
MAST		
Total	28.21 $\pm$ 10.06	.31*
Alcohol	25.73 $\pm$ 10.31	.34*
Drug	30.73 $\pm$ 9.23	.25*
ASI		
Medical status	0.33 $\pm$ 0.48	.25*
Employment/Self-support	0.51 $\pm$ 0.30	.07
Alcohol use	0.19 $\pm$ 0.23	.09
Substance use	0.13 $\pm$ 0.11	.40**
Legal status	0.36 $\pm$ 0.36	.32*
Family/social relations	0.26 $\pm$ 0.22	.39**
Psychiatric status	0.39 $\pm$ 0.24	.18

*P < 0.01

**P < 0.001

DISCUSSION

API was designed to evaluate the multiple dimensions of and the severity of dependence, to be sensitive to various substances, and to aid in treatment planning. The findings show that the scale is reliable and valid. Unlike other scales used to measure dependence, it does not evaluate the severity of dependency in a single dimension. It is distinct from all other scales in that it includes all dimensions related to the severity of addiction.

API has a very high coefficient of reliability overall. The subscales were observed to have moderate to high coefficients of reliability. The reliability coefficient of the motivation subscale was <0.70. Psychometric studies reported that a coefficient of reliability >0.60 is acceptable and that this coefficient decreases as the number of items on a scale decreases; therefore, low coefficients of reliability for scales with a small number of items should be evaluated in this context (Cortina 1993; Field 2005). In its present form API has high internal consistency.

Based on explanatory factor analysis, API had a good factor structure, including all items and subscale items. All subscales were represented in factors and loadings for all items were good. In its present form, API may be considered to include the diagnostic criteria, effect of substance use on everyday life, craving, and motivation subscales. The giving up other activities question was included in the effect on everyday life subscale, whereas it was expected to be included in the diagnostic subscale. Considering that this diagnostic criterion is

evaluated (6 items) the area remaining under the curve was 0.90 (P < 0.001, CI = 0.83-0.96), and its sensitivity was 0.85 and its specificity was 0.78 based on a cutoff score of 4. When the giving up social activities item was excluded from the factor analysis of the API effect on everyday life subscale (5 items), the area remaining under the ROC curve was 0.89 (P < 0.001, CI = 0.83-0.96). When the mean scores of the questions on the effect on everyday life subscale were added to the diagnosis subscale score, the area remaining under the ROC curve was 0.85 (P < 0.001, CI = 0.74-0.97).

indicative of a problem, this difference may be regarded as acceptable.

The API motivation subscale was correlated with SOCRATES, which evaluates motivation to quit in dependency. Likewise, the API craving subscale had a statistically significant correlation with PACS. Correlation coefficients between the API subscales and other scales were also significant for alcohol and other substance users. The findings show that the API subscales measured the targeted factors adequately. The API motivation subscale was not correlated with the substance use characteristics subscale. In addition, the correlation between the API motivation subscale, and the effect on everyday life and craving subscales was <0.25 . The relationship between the severity of dependence and motivation to quit is complex. In addition to studies that have reported a positive relationship between the severity of dependence and motivation to quit (Martin et al 2006; Hiller et al 2009), others reported that the effect of the severity of problems caused by dependence on motivation to quit varies during different stages of treatment (Carpenter et al. 2002). Moreover, it was reported that motivation to quit might vary according to the substance used (Levin et al. 2006). Factor analysis of the API subscales showed that the motivation subscale has a single factor structure. We think that the motivation subscale in its present form should be included in API.

The API total score was correlated with MAST, suggesting that MAST well known to measure the severity of substance dependence and API yield similar results. The low correlation coefficient between them may have been due to differences in the of dependence measured by MAST and the API subscales. It was observed that API was correlated with 4 ASI subscales; however, no correlation was observed between 3 ASI subscales and the API total score. The fact that API does not include questions about employment-support or psychiatric status might explain the lack of correlation between these ASI subscales and API. A correlation was not observed between alcohol use and API total score, which may have been due to the presence of a single question on alcohol in of the total API score. In addition, it was reported that there were problems associated with measuring alcohol use with ASI (Wertz et al 1995). The observed correlation between MAST and ASI scores, and API total score indicates that API is able to assess the severity of dependence.

The efficacy of the API diagnosis of dependence subscale in diagnosing dependence was evaluated using SCID-I, and it was observed that the subscale has high specificity and sensitivity. When the API diagnosis subscale was evaluated (6 items) the area remaining under the ROC curve was at maximum; hence, although 1 item on this subscale was included in another factor in factor analysis, we think that including 6 items on the API diagnosis subscale is warranted.

There was marked difference between genders in the present study's population in terms of number. It is not clear if the present study's findings are valid for women with dependency; therefore, additional research with a larger sample of women is necessary. The present study included participants with an alcohol and substance use disorder that had sought treatment, and individuals with alcohol/substance-related legal problems. We emphasize that API cannot be used as a screening tool in its present form.

It was reported that among those with an alcohol or substance use disorder, some may not be unable to complete self-report scales due to cognitive deficits (Kosten et al. 1985; Loimer et al. 1991). As such, we think that in addition to the self-report form an clinician-administered version of API should be developed. In individuals with alcohol and substance use disorders evaluation of the factors that influence treatment, such as anger, anxiety, and depression, will be useful in indentifying individual differences. In addition, it was reported that mental status is associated with substance use characteristics, craving, and motivation to quit (Elman et al. 2002); therefore, comprehensive evaluation of clinical status will facilitate holistic consideration of the problem of dependency (Litt et al. 2009). In conclusion, the preset findings show that API is valid and reliable for multidimensionally measuring the problems associated with alcohol and substance use, motivation to quit substance use, craving substance use, and the severity of dependence.

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Addiction Profile Index (API)

State if you have used these substances during the previous year, and if so how frequently.

		During the Previous Year				
		Never	Only a few times	1-3 times a month	1-5 times a week	Almost everyday
1	Alcohol	☐	☐	☐	☐	☐
2	Cannabis (marijuana).....	☐	☐	☐	☐	☐
3	Ecstasy	☐	☐	☐	☐	☐
4	Heroin	☐	☐	☐	☐	☐
5	Cocaine	☐	☐	☐	☐	☐
6	Crack	☐	☐	☐	☐	☐
7	Pills such as Rohypnol and Rivotril	☐	☐	☐	☐	☐
8	Volatile substances (paint thinner, glues, etc.)	☐	☐	☐	☐	☐
9	Various medical drugs (Akineton, Tantum, Xanax, etc.).....	☐	☐	☐	☐	☐
10	Amphetamine derivatives (methamphetamine, ice, etc.).....	☐	☐	☐	☐	☐
11	Others (LSD, GHB, etc.).....	☐	☐	☐	☐	☐

WARNING!

Substance refers to the drug you currently prefer to use; therefore, when answering these questions please refer to the drug you currently prefer using.

12	How often do you experience problems due to the effect of the (substance) (i.e. loss of consciousness, overdose, loss of control, etc.)									
	☐	Never	☐	Rarely	☐	Sometimes	☐	Usually	☐	Almost always

VIII	Do you think use of the (substance) is a problem for you? If so, for how long?									
	☐	Never?	☐	Less than 1 year	☐	1-2 years	☐	3-4 years	☐	5 years or more

State the frequency DURING THE PREVIOUS YEAR.

13	Has the amount of the (substance) you use increased over time?									
	☐	Never	☐	Rarely	☐	Sometimes	☐	Usually	☐	Almost always

14	Has the effect of the (substance) you use decreased even though you use the usual dose?									
	☐	Never	☐	Rarely	☐	Sometimes	☐	Usually	☐	Almost always

15	Did any problems arise when you discontinued or decreased use of the (substance) (for example sleeplessness, sweating, nervousness, restlessness, tremor, etc.)?									
	☐	Never	☐	Rarely	☐	Sometimes	☐	Usually	☐	Almost always

16	Have you ever used the (substance) because you were worried about the problems that might arise if you quit?									
	☐	Never	☐	Rarely	☐	Sometimes	☐	Usually	☐	Almost always

17	Do you have difficulty stopping after you start to use the (substance) (for example drinking more than you intended to drink or drinking for a longer period than you intended)?									
	☐	Never	☐	Rarely	☐	Sometimes	☐	Usually	☐	Almost always

18	Have you ever failed in your attempt to quit or decrease use of the (substance)?									
	☐	Never	☐	Rarely	☐	Sometimes	☐	Usually	☐	Almost always

19	Have you ever spent an excessive amount of time obtaining, using, or recovering from the effects of the (substance)?									
	☐	Never	☐	Rarely	☐	Sometimes	☐	Usually	☐	Almost always

20	Have you ever chosen not to do other activities (i.e. family visits, hobbies, socializing) so that you could use the (substance)?									
	☐	Never	☐	Rarely	☐	Sometimes	☐	Usually	☐	Almost always

State the frequency DURING THE PREVIOUS YEAR

21	Has (substance) use negatively affected your family relationships?									
	☐	Never	☐	Rarely	☐	Sometimes	☐	Usually	☐	Almost always

22	Has (substance) use influenced your professional/education life adversely?									
	☐	Never	☐	Rarely	☐	Sometimes	☐	Usually	☐	Almost always

23	Has (substance) use negatively affected your physical health?									
	☐	Never	☐	Rarely	☐	Sometimes	☐	Usually	☐	Almost always

24	Has (substance) use influenced your psychological health adversely?									
	☐	Never	☐	Rarely	☐	Sometimes	☐	Usually	☐	Almost always

25	Has (substance) use negatively affected you economically?									
	☐	Never	☐	Rarely	☐	Sometimes	☐	Usually	☐	Almost always

26	Has (substance) use influenced your relation with your friends and others adversely?									
	☐	Never	☐	Rarely	☐	Sometimes	☐	Usually	☐	Almost always

27	Has (substance) use caused you to get into trouble (e.g. fight, accident, inadvertent sexual relationship/pregnancy, venereal disease, etc.)?									
	☐	Never	☐	Rarely	☐	Sometimes	☐	Usually	☐	Almost always

28	Has (substance) use resulted in legal problems (for example losing your drivers license, trouble with police, etc.)?									
	☐	Never	☐	Rarely	☐	Sometimes	☐	Usually	☐	Almost always

29	Have you ever used (substance) during daytime?									
	☐	Never	☐	Rarely	☐	Sometimes	☐	Usually	☐	Almost always

30	Have you used (substance) when you didn't want to?									
	☐	Never	☐	Rarely	☐	Sometimes	☐	Usually	☐	Almost always

31	Your family and friends worried that you use too much (substance)?									
	☐	Never	☐	Rarely	☐	Sometimes	☐	Usually	☐	Almost always

State the frequency DURING THE PREVIOUS WEEK

32	How often did you think about the pleasing/comforting effect of (substance)?				
	☐ Never	☐ Rarely	☐ Sometimes	☐ Usually	☐ Almost always

33	How often did you have a strong craving for (substance)?				
	☐ Never	☐ Rarely	☐ Sometimes	☐ Usually	☐ Almost always

34	Was it difficult for you to resist using (substance) when it was available?				
	☐ Never	☐ Rarely	☐ Sometimes	☐ Usually	☐ Almost always

35	Did you think that (substance) use is a problem for you?				
	☐ Never	☐ Rarely	☐ Sometimes	☐ Usually	☐ Almost always

36	Did you consider quitting or decreasing (substance) use?				
	☐ Never	☐ Rarely	☐ Sometimes	☐ Usually	☐ Almost always

37	Did you think that quitting or decreasing use of (substance) is important to you?				
	☐ Never	☐ Rarely	☐ Sometimes	☐ Usually	☐ Almost always

Calculation Guide

Substance use characteristics

$(b1 + b2 + b3 + b4 + b5 + b6 + b7 + b8 + b9 + b10 + b11)/11 + b12$

Diagnosis

$(b13 + 14)/2 + (b15 + 16)/2 + b17 + b18 + b19 + b20$

Effects on persons' life

$b21 + b22 + b23 + b24 + b25 + b26 + b27 + b28 + b29 + b30 + b31$

Craving

$b30 + b32 + b33 + b34$

Motivation

$b35 + b36 + b37$

API total score (severity of addiction)

Substance use characteristics subscale score/2 + diagnosis subscale score/6 + psychosocial effect subscale score/10 + craving subscale score /4 + motivation subscale score/3

SPSS Syntax Guide

Compute Mady = mean (b1, b2, b3, b4, b5, b6, b7, b8, b9, b10, b11) + b12.

Compute B1314 = mean (b13 b14).

Compute B1516 = mean (b15 b16).

Compute Tani =sum (b1314, b1516, b17, b18, b19, and b20).

Compute Yasam = sum (b21, b22, b23, b24, b25, b26, b27, b28, b29, b30, b31).

Compute Crav = sum (b30, b32, b33, b34).

Compute Motiv = sum (b35, b36, b37).

Compute API total = mady/2 + tani/6 + yasam/10 + motiv/3 + crav/4.

Explanation of SPSS variables used in syntax

Mady = substance use characteristics

Tani = diagnosis

Yasam = effects on persons' life

Crav = craving

Motiv = motivationto quit