Eur Child Adolesc Psychiatry (2009) 18:653–661
DOI 10.1007/s00787-009-0021-z

ORIGINAL CONTRIBUTION

Psychometric and discriminative properties of the Teen Addiction Severity Index (Brazilian Portuguese version)

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Received: 21 October 2008 / Accepted: 26 March 2009 / Published online: 18 April 2009

Abstract In this study we evaluated the internal consistency of the Brazilian Portuguese version of Teen Addiction Severity Index (T-ASI) and validated its "substance use" area. Evaluating 100 psychoactive substance abusers/dependent adolescents (SUD) and 108 adolescents without such diagnosis (NON-SUD), we found good correlations between the classification by the Composite International Diagnostic Interview (CIDI, used as "gold standard") and the severity ($r = 0.73$) and composite ($r = 0.72$) scores of the T-ASI. The area under the ROC curve was 0.88, showing a satisfactory correct classification rate. The internal consistency, evaluated by Cronbach's alpha coefficients, was considered good regarding the substance use (0.89), legal (0.81), and psychiatric (0.80) areas of the T-ASI. The Brazilian Portuguese version of T-ASI presented good internal consistency and a valid substance use area. A comparison between the groups regarding the answers to each question in all the areas was conducted in order to identify which questions in the T-ASI discriminate SUD from NON-SUD adolescents, to have a basis for the proposal of a shorter version of the instrument.

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Keywords Adolescents · Substance use · Assessment · Treatment planning · Psychometric properties

Introduction

Epidemiological data show that the use and abuse of substances by adolescents have grown significantly. This is a great concern for parents and professionals in the area of health and education [5, 10, 26, 30]. According to Needle et al. [20], substance consumption has an early start in adolescence, around the age of 10–11 years, or even before. In Brazil, surveys carried out by Galduróz et al. [10] showed that among adolescents in the age range of 10–12, 41.2% had already used alcohol, 7% tobacco, and 12.6% other drugs.

Many studies suggest that the earlier the use, the greater the probability of negative consequences, such as psychiatric disorders, developmental delay, and cognitive impairments [2, 16]. Other data suggest that a good prognosis of success in the treatment of substance-dependent individuals is related to early intervention [21]. Therefore, it is crucial to detect the abusive use or dependence in their initial phases; and it is fundamental that health professionals have access to adequate assessment instruments that can guide them as regards the patient's needs and interventions to be carried out.

In Brazil, even though there are some instruments for the screening and diagnosis of substance use and associated problems, validated for the adult population, few are the instruments validated for adolescents [7, 9]. There is a version of the Drug Use Screening Inventory (DUSI [6, 28, 29], translated to Brazilian Portuguese and validated to be used in the screening of alcohol and drug associated problems, and a Brazilian instrument called "*Escala de*

Seguimento de Alcoolistas - adolescentes" (Scale of Follow-up on Alcoholics—adolescents, [25]), to be used in the follow-up of patients under treatment, but there are no adequate instruments to the treatment planning.

Among the instruments used to determine the pattern of use of alcohol and other drugs, the severity of problems associated with the use and the need for treatment in many areas, we should highlight the semi-structured interview—Addiction Severity Index (ASI), developed by McLellan et al. [17–19]. This instrument evaluates many areas: substance use, medical, psychiatric, family, social, legal, and employment. However, even though it is largely used worldwide, it has been observed that the ASI is inadequate for the adolescent population, since it excludes some areas that contextualize the life of the adolescents, such as school, family functioning, and relationship with friends. In addition, the ASI contains questions about problems specific to adults, such as working, having income, and being married, besides others that evaluate consequences for the patient's health, an aspect that is often not clearly impaired by the use of substance in adolescence.

Having the original version of the ASI for adults as a starting point, Kaminer et al. [14, 15] developed an adaptation to be used with adolescents—the Teen Addiction Severity Index ("T-ASI"). They omitted some questions from the original instrument, reformulated or added others, making it suitable for the adolescent population [12, 15]. Kaminer proposed the use of the T-ASI as a tool to evaluate the use of alcohol and/or drugs in adolescents. It is an instrument that can provide important data for the therapeutic planning, the follow-up of treatment, and the evaluation of its effectiveness [4, 12, 33]. The American version presented good psychometric properties. The inter-rater reliability was $r = 0.85$ for the substance area, for example [14]. In a preliminary study on the validation of the T-ASI, the correlation between the score of severity in the area of substance use of the T-ASI and the scores in the section of alcohol and substance abuse of the instrument Kiddie Schedule for Affective Disorders and Schizophrenia—Epidemiological version (K-SADS-E), which provides a diagnosis according to the DSM-III-R, was $r = 0.76$ for alcohol and $r = 0.86$ for drugs. Considering cultural factors may influence the performance and adequacy of an instrument, it is important to assess whether the translation was adequate, and whether it kept the psychometric properties of the instrument in the other language. Currently, the T-ASI is being adapted and validated for diverse languages and countries [8, 13].

Objectives

The objectives of this work were to carry out a concurrent validation of the "substance use" area of the T-ASI, using the CIDI [22, 23] as the "gold standard"; to evaluate the internal consistency of its areas and the dimensionality of the instrument, and the correlation between its severity and composite scores; and to identify which questions in the T-ASI discriminate SUD from NON-SUD adolescents, in order to have a basis for the proposal of a shorter version of the instrument.

Methods

Participants

A total of 208 adolescents between 12 and 19 years of age participated in the study. We used a criteria sample, including 100 adolescents who fulfilled the criteria of the CIDI (DSM-IV) for substance use disorders (SUD) and 108 adolescents who did not fulfill the criteria of the CIDI (DSM-IV) and had never used alcohol and/or drugs (NON-SUD). About 48% of the adolescents received more than one diagnostic. The most common diagnostic was for alcohol problems (dependence: 63% and abuse: 20%), followed by cannabis (dependence: 34% and abuse: 6%), tobacco (dependence: 34%), cocaine/crack (dependence: 18% and abuse: 3%), inhalants (dependence: 16% and abuse: 4%), sedatives (dependence: 5% and abuse: 5%), and amphetamines/opioids/hallucinogens (dependence: 3% and abuse: 3%). About 30% of the adolescents in the group of users were under treatment in clinics that specialize in alcohol and drug problems. All the other adolescents were approached directly by the researcher in various places, including their school, home, and public places. We did not include patients with a diagnosis of severe psychosis, as assessed by the professionals in the treatment clinics, neither those with mental retardation, great difficulty to communicate orally or intoxicated at the time of the interview. In order to comprise this sample, the researcher approached them directly in different places, including schools, home, public places, and specialized clinics for the treatment of alcohol and/or drug dependence. After the schools and clinics authorized the interviews, we invited the adolescents individually and made an appointment for the application of the instrument. We also used the snowball technique, where one volunteer appoints another, until the adequate number of volunteers is reached.

Instruments

1. Questionnaire on socio-demographic data, devised by the authors of the study.
2. Teen Addiction Severity Index (T-ASI [14, 15]. The Brazilian Portuguese version of the T-ASI was translated by the main investigators of this study, back

translated by a professional translator and reviewed by the author of the original T-ASI.

The instrument comprises of 153 questions divided into seven categories: *substance use*, *school status*, *employment status*, *family function*, *peer–social relationships*, *legal status*, *and psychiatric status.* Most of the questions allow "yes" or "no" or quantitative answers (e.g., the number of times an event took place), but there are also some open-ended questions. Other questions have to be answered through a Likert-type scale that is presented to the interviewee: 0 = not at all, 1 = slightly, 2 = moderately, 3 = considerably, and 4 = extremely. The severity score in each area was determined by the combination of the interviewer's classification and that of the respondent as regards the need for treatment. In order to determine the severity score, we also use an ordinal scale of the Likert type with 5 possible scores: 0 = no real problem, without indication for treatment; 1 = slight problem, treatment if necessary; 2 = moderate problem, treatment suggested; 3 = considerable problem, treatment necessary; 4 = extreme problem, treatment absolutely necessary. According to the instructions manual (provided by the original author and translated into Brazilian Portuguese), after analyzing the objective and subjective answers to the questions in each area, the interviewer calculates the *interviewer's severity rating* by choosing two scores from the ordinal scale, pondering the final result by the classification provided by the interviewee as to his/her need for treatment. We also calculated the composite scores for each area, except for the work area, as proposed by Brodey et al. [3]. Each answer regarding problems in the last 30 days was converted into a standardized score being the value of the answer divided by the maximum possible value.

3. Composite International Diagnostic Interview (CIDI)—Aiming at establishing the diagnosis of abuse and/or dependence according to the criteria of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) [1] criteria, we used the sections on tobacco, alcohol, and drugs of the previously translated and validated Brazilian Portuguese version of CIDI [22, 23]. We used the software CIDI 2.1, developed by the World Health Organization, to determine the diagnosis [34].

Procedures

All the interviews were carried out by a psychologist with experience of adolescents who have alcohol and drug-related problems. In order to apply the T-ASI, the psychologist was trained by a technician who, in turn, had been trained by the author of the original instrument. The training on the application of the CIDI 2.1. was carried out by the main researcher of the validation of the instrument for Brazil.

We administered all the instruments in an isolated and silent place, where only the interviewer and the interviewee were present. First, we applied a questionnaire on socio-demographic data, then the T-ASI, and finally the sections on tobacco, alcohol, and drugs of the CIDI. All the instruments were applied on the same day. The patients participated voluntarily and did not receive any payment.

Statistical analysis

We used the χ^2-test to compare the groups as regards nominal variables, the Student's *t*-test to compare the interval variables with normal distribution. In order to study the criteria (concurrent) validity of the T-ASI, we calculated the Spearman's correlation coefficients between the area of substance use and the severity (or composite) scores of the T-ASI and the classification of abuse/dependence provided by the CIDI (0 = no abuse or dependence; 1 = abuse; 2 = dependence). We also calculated a Receiver Operating Characteristic (ROC) curve to evaluate the rate of correct classification, according to the severity scores of the T-ASI. In order to analyze the internal consistency of the seven areas of the T-ASI, we calculated the Cronbach's alpha coefficients. For the analysis of the relation among the seven areas of the T-ASI we calculated the correlations between its composite scores. We used the Spearman's correlation coefficients to analyze the relation between the composite and severity scores. The software STATISTICA [27] was used for all the statistical tests.

Ethics

Before applying the questionnaires, we informed the interviewee on the objectives of the study and assured him/her of the confidentiality of the data. Each participant signed a consent form of voluntary participation, devised according to the norms of the Committee of Ethics in Research of the Federal University of São Paulo (UNIFESP), which approved the project (CEP UNIFESP protocol 0202/03).

Results

The application of the T-ASI lasted 26 min on an average (min = 8 and max = 65; SD = 10) and that of the CIDI 20 min (min = 5 and max = 60; SD = 13). The time variation depended on the number of substances reported

by the SUD volunteers. According to Table 1 in the NON-SUD group, the proportion of men and women was similar (52% men and 48% women), but there was a higher prevalence of males in the SUD group (67%). The mean age of the respondents was 15 (SD = 2) among the NON-SUD and 17 (SD = 1.5) among the SUD.

Table 2 shows the mean of the composite scores and severity ratings of the NON-SUD and SUD groups, and the Spearman correlations (ordinal scale) coefficients between the severity and composite scores. The mean of the composite scores and severity ratings were significantly higher in the SUD group in all the areas except in the family area. The correlations between the composite and severity ratings were good in the areas of *substance use* (0.85), *legal status* (0.82), *school status* (0.75), and *psychiatric status* (0.72), moderate in the *peer–social relationships* area (0.56) and low in the *family function* area (0.19).

Table 1 Socio-demographic data of psychoactive substance abusers/dependent adolescents (SUD, $n = 100$) and adolescents without such diagnosis (NON-SUD)

Characteristics	NON-SUD ($n = 108$)	SUD ($n = 100$)
Age (years)		
M (SD)	15 (2)	16.9 (1.5)#
Band	12–19	13–19
Gender		
Male	52	67*
Female	48	33
Ethnic group		
Caucasian	474	63
Mixed	21.5	19
Asian	17	7
African–American	13.9	11
Religious		
Catholic	54.6	48
Protestant	17.6	14
Spiritualist	11.1	7
Other	4.6	11
None	12	20
Work	14.8	27*
School status		
Students	98	79*
Without delay	68.5	53*
1 to 2 years of delay	24.1	27
3+ years of delay	7.4	20*
Social class		
Upper	16.7	22
Middle upper	35.2	34
Middle	38	37
Low	10.2	7

All data are in percentage

Differs from the NON-SUD ($P < 0.05$) by the Student's *t*-test

* Differs from the NON-SUD ($P < 0.05$) by the χ^2 test

Table 3 shows the correlations between the six composite scores of the T-ASI. In the NON-SUD group, we observed low correlations between the composite score of the area substance use and all the composite scores of the other areas. In the SUD group, on the other hand, we observed moderate to low correlations between the composite scores in the area substance use and the composite scores of *legal status* ($r = 0.48$), *psychiatric status* ($r = 0.30$), and *social/peer relationships* ($r = 0.24$) areas, but low correlations with the composite scores of all the other areas. We detected significant (although low) correlations between composite scores of *psychiatric status* and *peer/social relationships* areas, in both groups. We also detected a significant but low correlation ($r = 0.28$) between the composite scores of the *psychiatric* and *legal* areas in the SUD group. The other correlations between the areas were very low, confirming the multidimensionality of the instrument.

Concurrent validity and internal consistency

In order to evaluate the concurrent validity (criteria validity) of the area of substance abuse, we calculated the Spearman's correlation coefficient between the classification by the CIDI (considered the "gold standard") and the severity and composite scores of the *substance use* area of the T-ASI. The correlations were considered good (severity ratings, $r = 0.73$, $P < 0.01$ and composite score, $r = 0.72$, $P < 0.0001$), indicating a good concurrent validity of the area *substance use* of the T-ASI.

Figure 1 shows the ROC curve calculated to establish the discriminating power of cutoff points through the severity ratings of the T-ASI. The Area Under the Curve (AUC) was 0.88 (95% CI: 0.83–0.93, $P < 0.0001$), showing a good discriminating capacity, with high percentage of correct classification of the cases.

The Cronbach's alpha coefficients were used to evaluate the internal consistency. In the areas, *substance use* (0.89), *legal status* (0.81), and *psychiatric status* (0.80) the internal consistency of the items was high assuring the reliability of the instrument. On the other hand, the area *school status* presented only a moderate reliability (0.48), while the areas, *family* (0.18) and *peer–social relationships* (0.21) presented low-reliability rates.

In order to identify the questions in the T-ASI that discriminated SUD from NON-SUD adolescents, we carried out comparisons between the groups regarding the answers to each question in all the areas. The questions in the area *substance use* that discriminated between the two groups were those related to the number of days on which they had used substance in the last 30 days; the amount of

Table 2 Composite scores in the seven areas of the T-ASI, and Spearman's coefficient correlations between the interviewer's composite score and severity rating in each area, in the group of psychoactive substance abusers/dependent adolescents (SUD, $n = 100$) and adolescents without such diagnosis (NON-SUD, $n = 108$)

Areas of the T-ASI	Composite scores (Mean ± SD)		Severity scores (Mean ± SD)		Spearman correlation between the composite score and severity rating
	NON-SUD	SUD	NON-SUD	SUD	
Substance use	0.01 ± 0.02	0.13 ± 0.14***	0.5 ± 1	2.6 ± 1.4 ***	0.85**
School	0.04 ± 0.04	0.1 ± 0.1***	1.1 ± 1.2	1.6 ± 1.4 ***	0.75**
Employment	–	–	0.3 ± 0.7	0.8 ± 1.2	
Family	0.4 ± 0.1	0.4 ± 0.2	1.1 ± 1.1	2.1 ± 1.4 ***	0.19*
Social relationship	0.2 ± 0.1	0.3 ± 0.1***	0.7 ± 1	1.2 ± 1.2 ***	0.56**
Legal	0.01 ± 0.03	0.1 ± 0.2***	0.1 ± 0.6	1 ± 1.4 ***	0.82**
Psychiatric	0.1 ± 0.13	0.3 ± 0.2***	1.1 ± 1.2	2 ± 1.2 ***	0.72**

* $P < 0.01$; ** $P < 0.0001$; *** Differs from the NON-SUD ($P < 0.01$) by the Student's t-test

Table 3 Spearman's correlation coefficients between the composite scores of the areas of the T-ASI

T-ASI scales	Substance use	School	Family	Social relationship	Legal
School	0.16*				
Family	0.07	0.09			
Social relationship	0.28*	0.04	0.12		
Legal	0.45*	0.15*	−0.03	0.09	
Psychiatric	0.42*	0.16*	0.11	0.30*	0.32*

* $P < 0.05$

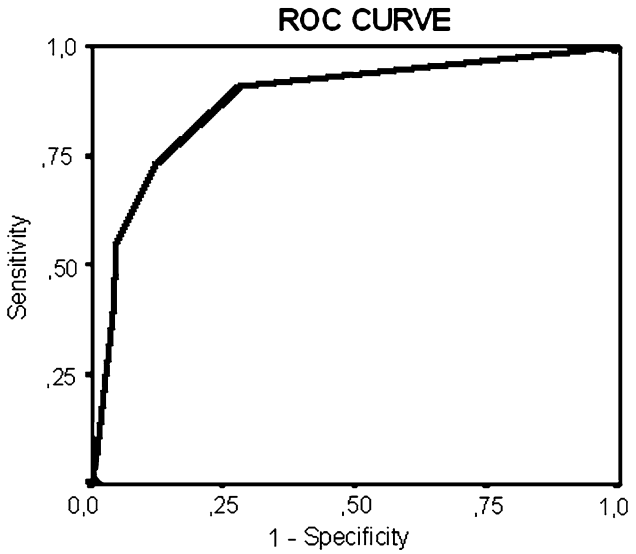

Fig. 1 Receiver operating characteristic (ROC) curve. The severity ratings of the T-ASI substance use area were used as cut-off points. Area Under Curve (AUC) = 0.88

money spent on alcohol, drugs, and tobacco; the degree of discomfort caused by those problems and the reported need for treatment—all of them higher among the SUD. The groups also differed as to the means to get the drugs: from friends (34% among the SUD and 3.7% among the NON-SUD) or from a dealer (18% among SUD and 1.9% among NON-SUD). It was not possible to perform statistical analyses as regards the questions on the drugs reported as the main cause of problems and their reason, combination of drugs, withdrawal, blackout, overdose, and those regarding treatments already done in life, due to the very low frequency of answers among the NON-SUD. We could observe, however, that those questions were clearly discriminating, since there were positive answers only in the SUD group. As shown in Table 4, the questions in the area *school status*, the only one that discriminated the groups were those related to absences and delays; the degree of discomfort caused by the problems and the need for treatment, higher among the SUD. Few questions in the area *employment status* differentiated between the groups: a higher degree of discomfort due to unemployment and a higher need for counseling among the SUD. In the *family function* area, the groups differed in the questions regarding the frequency of conflicts with the mother (36% among SUD and 9.3% among NON-SUD), level of support from family members, and the presence of clear rules, all of them higher among the NON-SUD, and the frequency of arguments and level of discomfort caused by the problems, higher among the SUD. In the *peer–social relationships* area, the groups differed in the questions regarding the number of conflicts with friends, the level of discomfort caused by the problems, the number of close friends who used substance regularly, higher among the SUD, and the level of satisfaction with friends, higher among the NON-SUD.

In the *legal status* area, the differentiating questions were those regarding being on parole, having been arrested, charged or placed in a youth detention center, being awaiting charges, the number of days involved in illegal activities, and the degree of discomfort caused by those

Table 4 Questions of the T-ASI about school, employment, family, social, legal, and psychiatry problems which discriminate alcohol/drug problematic users (SUD) from occasional/non-users (NON-SUD)

Questions	NON-SUD ($n = 108$)	SUD ($n = 100$)	Statistical	P-value
School area				
Days missed				
Last month	2.6 ± 4.1	5.6 ± 7.3	$t(185) = 3.5$	0.0001
Last 3 months	6.9 ± 10.4	13 ± 17.1	$t(184) = 3$	0.002
Days late				
Last month	2.1 ± 5.6	7.9 ± 10.5	$t(185) = 4.9$	0.0001
Last 3 months	4.1 ± 11.8	19.9 ± 28.2	$t(185) = 5.2$	0.0001
Skipped classes				
Last month	1.5 ± 3	5.2 ± 8.3	$t(185) = 4.2$	0.0001
Last 3 months	2.7 ± 4.3	13 ± 19.5	$t(186) = 5.3$	0.0001
Troubled with problems in the last month	0.9 ± 1.1	1.6 ± 1.6	$t(185) = 3.4$	0.0001
Treatment necessity in the last month	0.6 ± 1	1 ± 1.2	$t(185) = 2.3$	0.02
Employment area				
Troubled with problems in the last month	0.6 ± 1.1	1.3 ± 1.5	$t(181) = 3.2$	0.01
Treatment necessity in the last month	1 ± 1.4	0.3 ± 0.8	$t(176) = 4$	0.0001
Family area				
Conflicts with mother	36%	9%	$\chi^2(1) = 24$	0.0001
Family support	2.9 ± 1	2.3 ± 1.3	$t(202) = -3.4$	0.0001
Conflicts with one another	1 ± 0.8	1.5 ± 1.2	$t(202) = 3.3$	0.0001
Rules enforced	2.3 ± 1.1	1.9 ± 1.3	$t(202) = -2$	0.05
Troubled with problems in the last month	0.7 ± 1	1.6 ± 1.4	$t(202) = 5.2$	0.0001
Social Relationship area				
Number of conflicts with friends				
Last month	0.5 ± 1.5	2.3 ± 5	$t(204) = 3.5$	0.0001
Last 3 months	0.8 ± 2.8	5.5 ± 13.8	$t(204) = 3.4$	0.0001
Satisfactions with friends	3.1 ± 1	2.7 ± 1.1	$t(204) = -2.6$	0.01
Troubled with problems	0.7 ± 1.1	1 ± 1.2	$t(206) = 2.2$	0.03
Legal area				
Parole (actual)	0%	11%	$\chi^2(1) = 12.5$	0.001
Number of times were arrested	0 ± 0.3	0.7 ± 1.8	$t(206) = 4$	0.0001
Number of times were placed in a youth detention center	0 ± 0.1	0.4 ± 1.2	$t(205) = 3.6$	0.0001
Waiting sentence	0%	10%	$\chi^2(1) = 11.5$	0.0001
Days of illegal activities in the last month	0.2 ± 1.5	2 ± 6.7	$t(206) = 2.7$	0.01
Troubled with problems in the last month	0.1 ± 0.4	0.4 ± 1	$t(206) = 3.8$	0.0001
Psychiatry area				
Depression in life	6.5%	24%	$\chi^2(1) = 12.6$	0.0001
Anxiety in life	16.7%	55%	$\chi^2(1) = 33.5$	0.0001
Concentrating/remembering problems in life	16.7%	52%	$\chi^2(1) = 29$	0.0001
Controlling violent behavior problems in life	7.4%	30%	$\chi^2(1) = 17.7$	0.0001
Serious thoughts of suicide	8.3%	31%	$\chi^2(1) = 17.2$	0.0001
Attempted suicide	3.7%	16%	$\chi^2(1) = 10.3$	0.01
Taken prescribed medication for psychiatry problem	9.3%	23%	$\chi^2 = 7.3$	0.01
Days have experienced psychiatry problems in the last month	2.4 ± 6.5	8 ± 11.2	$t(206) = 4.5$	0.0001
Troubled with problems in the last month	0.7 ± 1.2	1.2 ± 1.4	$t(206) = 3$	0.01
Treatment necessity in the last month	0.4 ± 1	1.1 ± 1.4	$t(206) = 4.5$	0.0001

problems with the law, all of them higher among the SUD. Finally, in the *psychiatric status* area, the adolescents from the SUD group reported presenting, more often than those from the NON-SUD group, depression, anxiety, cognitive problems, difficulty to control violent behavior, suicide ideation and attempt, higher use of medication due to psychological problems, and higher degree of discomfort caused by those problems. The adolescents from the SUD group presented clear signs of depression/withdrawal, anxiety/nervousness, or cognitive problems during the interview.

Discussion

The Brazilian Portuguese version of the T-ASI showed a similar performance to that of the original instrument. We obtained good correlation indices between the diagnostic classification by the CIDI and the severity ($r = 0.73$) and composite scores ($r = 0.72$) of the *substance use* area of the T-ASI. The data obtained in this study suggest that it can be a useful instrument to evaluate the severity of substance use and associated problems in adolescents. The good correlation levels found between the scores in the T-ASI and the classification by the CIDI are indicators of its good concurrent validity. The indices of sensitivity and specificity of the *substance use* area were high, showing good capacity to discriminate between SUD and NON-SUD.

Other authors reported similar results after translating the T-ASI into other languages, which points to its strong psychometric properties. In a recent study on a Spanish version developed by Díaz et al. [9], the severity scores of T-ASI presented good correlation with other instruments. In the *substance use* area the authors adopted the pattern of use of and subjective problems with any drug as external validity indicators, with correlation indices of $r = 0.90$ and 0.69, respectively.

Brodey et al. [3] compared indicators of validity for three versions of the T-ASI: clinical interview (traditional), version for the Internet and version for telephone. They found high correlations between the scores obtained in the three versions, and concluded that the alternative versions correlate well with the traditional version. The authors also correlated the composite scores of the three versions of the T-ASI with the scores in the Personal Experience Screening Questionnaire (PESQ, [31]), Personal Experience Inventory (PEI, [32]), and Problem-Oriented Screening Instrument for Teenagers (POSIT, [24]) scales, and found similar validity indices. As to the correlations between the ratings obtained in the T-ASI clinical interview and the screening instruments mentioned above, most of them were significant, even though they were low or moderate. In the *substance use* area of the T-ASI, the best correlations were with the PEI use of drugs ($r = 0.47$) and the POSIT use of substances ($r = 0.41$).

In our study, the internal consistency of the *substance use*, *legal and psychiatric status* areas was high, showing good reliability. However, the same was not true for other areas. The internal consistency was only moderate in the *school status* area and poor in the *family function* and *peer/social relationships* areas. Other authors also described similar problems. Brodey et al. [3] found indices of internal consistency that varied according to the version of the T-ASI. High indices were found in the area *substance use* of the Internet ($r = 0.75$) and telephone ($r = 0.76$) versions, as well as in the *psychiatric status* ($r = 0.83$ in the Internet version and $r = 0.80$ in the telephone version). The traditional version presented moderate internal consistency in all the areas, as did the other areas of the alternative versions. An exception should be made as regards the *peer/social relationships* area, with low indices in the three versions.

Most of the correlations between the areas of the T-ASI were low, confirming the independence of the areas and the multidimensional nature of the instrument, allowing the independent use of each area, as suggested by the authors of the original instrument [14].

In our study, many questions of the T-ASI did not distinguish between the adolescents who regularly used drugs from those who did not, which suggests that if the purpose of its use is to help in the diagnosis, some non-discriminating questions could be suppressed. If we considered only the questions that discriminated problem users from non-users/occasional users, we could reduce the 153 questions of the original instrument to 63 questions. Taken into account the profile of the target population, a shorter and Internet-based version could be advisable.

Among the reasons that influence the discriminating capacity of the questions, we have to consider the differences between the culture in which the instrument was devised and that in which it is being used [11]. Regarding the present study, for instance, the area *employment/support* was the one that presented the lowest discriminating capacity between the groups. This might be due to the low prevalence of adolescents in the Brazilian sample who worked (19%), since, unlike in other cultures, ours does not encourage middle and upper class youths to work, differently from the American culture, in which the T-ASI was developed. Therefore, the evaluation of this area in the Brazilian adolescent population may not be as important as it is in other cultures. Another point that is subject to local differences is the present situation of the Brazilian education. It has been facing a crisis of quality, affecting both adolescents with and without SUD, causing a general dissatisfaction regarding the school situation.

As regards the *family function* area, it is important to notice that the adolescents do not consider family treatment/counseling essential to improve their family relationships even though they detect problems in this area. The fact that this area uses scales of the Likert type more often than other areas might have caused ambiguity in the answers, since many adolescents were unsure when choosing among the alternatives. Another difficulty observed was related to the concepts of "confidence" and "expressiveness", which were subjectively interpreted, causing a high level of variability in the answers, in both groups.

Conclusion

Our data indicated that the Brazilian Portuguese version of T-ASI has good concurrent validity and can be a useful instrument to evaluate the severity of substance use and associated problems in adolescents. Its indices of sensitivity and specificity indicate good capacity to discriminate between SUD and NON-SUD. Considering the questions that discriminated problem users from non-users/occasional users it would be possible to develop a shorter version of the instrument with about 60 questions.

Limitations

In the present study, we limited ourselves to the evaluation of the validity regarding the *substance use* area. In order to validate the other areas of the T-ASI, other studies, using specific and validated (gold standard) instruments, are necessary. Further work is necessary to clarify the influence of ethnicity and gender on performance of the evaluation areas of the T-ASI.

Acknowledgments This study was supported by the Associação Fundo de Incentivo à Psicofarmacologia (AFIP), Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP), and Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq). The authors wish to express their appreciation to the volunteers, staffs, and clients of the participating substance abuse treatment clinics whose contributions made this research possible. Appreciation is also expressed to the research staff of the Drug Dependence Unit who participated in this research and to Ms. Maria Helena Pagdi for assistance in translation of the manuscript to English.

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