

PSYCHOMETRIC STUDY OF AN ADOLESCENT SUBSTANCE USE SCALE

ESTUDIO PSICOMÉTRICO DE UNA ESCALA SOBRE USO DE DROGAS EN ADOLESCENTES

Inmaculada Méndez Mateo¹, Fuensanta Cerezo¹ y José Antonio López Pina²

¹ Departamento de Psicología Evolutiva y de la Educación, Universidad de Murcia, España

² Departamento de Psicología Básica y Metodología, Universidad de Murcia, España

Abstract

Background. The study of drug use and other adolescent problem behaviours is approached from different preventive strategies. Schools are important as an environment in assessing the situation. Most instruments to evaluate this problem are limited in the type of drugs as well as in the implementation of related risk behaviours. **Methods.** This paper presents the psychometric study of a scale based on the ESTUDES survey to detect adolescent substance use, health consequences and challenging behaviours in educative contexts. FRIDA was selected to assess the concurrent validity. Participants were 1.264 students ($M = 14.41$, $SD = 1.43$) who participated voluntarily. Informed consent was requested. An exploratory factor analysis of the 19 selected items was carried out using the WLMSV method on tetrachoric correlation matrix and Geomin rotation with MPLUS was employed. **Results.** The results showed the scale consists of two factors: Factor I, substance abuse and health consequences, based on the use of illegal drugs, and Factor II, use of legal drugs and challenging behaviours. **Conclusions.** It is a short instrument for the detection of drug use, health consequences and challenging behaviours in the educational field.

Keywords: adolescence, education/school, intervention/prevention, substance use (drugs, alcohol, smoking).

Resumen

Introducción. El estudio del consumo de drogas y otras conductas problemáticas en la adolescencia se aborda desde diversas estrategias preventivas. Los centros escolares constituyen un entorno para evaluar la situación. Los instrumentos existentes para conocer esta problemática están limitados en el tipo de droga así como en la realización de conductas de riesgo relacionadas. **Metodología.** Este trabajo presenta la validación de una escala basada en la encuesta ESTUDES para la detección del consumo de drogas en adolescentes, consecuencias para la salud y conductas desafiantes. FRIDA fue seleccionado para evaluar la validez concurrente. Los participantes del estudio fueron 1264 estudiantes ($M = 14.41$, $SD = 1.43$) que participaron voluntariamente. Se solicitó el consentimiento informado a los participantes. Se realizó un análisis factorial exploratorio de los 19 ítems seleccionados empleando el método WLMSV sobre la matriz de correlaciones tetracóricas y el método de rotación Geomin con MPLUS. **Resultados.** Los resultados mostraron que la escala consta de dos factores: Factor I, Consumo de sustancias ilícitas y consecuencias para la salud, basado en el consumo de drogas ilegales, y Factor II, Consumo de drogas legales y conductas desafiantes. **Conclusiones.** Se trata de un instrumento breve para la detección del consumo de drogas en adolescentes, consecuencias para la salud y los comportamientos desafiantes en el ámbito educativo.

Palabras clave: adolescentes, centro escolar, prevención/intervención, uso de drogas (drogas, tabaco, tabaco).

The United Nations Office on Drugs and Crime – UNODC– World Drug Report (2015) shows that one in 20 people aged 15 to 64 used illegal drugs; one in three was female and more than one in 10 were problem users. Opiate use was stable, cannabis and non-medical use of opioids was increasing. It is necessary to plan strategies for prevention of drug use, and to change the approach, taking into account the context in which it occurs, and especially the vulnerability of adolescent.

Moreover, data from the latest report revealed that alcohol consumption has increased among 14 to 15 year olds. Intensive consumption of alcohol is very common, especially among girls between 14 and 16 years old, also associated with the use of illegal drugs (39.9% use more than one substance). Cannabis remains highly prevalent among adolescents. This has an impact on the indicators of problems associated with drug use, showing a greater role of cannabis in drug treatment services and hospital emergencies. Students have remarkably easy access to alcohol and cannabis, and there is also the existence of low risk perception (DGPNSD, 2016). For this purpose, the report by the European Monitoring Centre for Drugs and Drug Addiction –EMCDDA– (2015) shows that environmental prevention strategies can encourage changes in normative beliefs and drug use -though these measures are rarely used in Europe-, and that there has been progress in providing protecting school climates and developing drug policies, in addition to stressing that selective prevention interventions should target adolescent groups vulnerable to drug use (i.e., pupils with social and academic problems). In some schools, early detection and intervention approaches are used but often based on the provision of counselling only to adolescents substance use.

Accordingly, some scales to evaluate consumption in adolescents have been developed. For example, FRIDA - Interpersonal Risk Factors for Drug Use in Adolescence (Secades, Carballo-Fernández, García-Rodríguez and García-Cueto, 2006) - it informs about interpersonal risk factors for drug use; Cronbach's alpha reliability coefficient was .925 for total scale scores. Fernández-Artamendi et al. (2012) adapted and validated the CPQ-A (Adolescent Cannabis Problems Questionnaire) in Spanish population ($\alpha = .86$). Camacho et al. (2013) examined Spanish adaptation of the Expectancy Questionnaire (EQ) regarding alcohol effects in

adolescents (14-17 years). Cronbach's alphas ranged from .75 to .96. On the other hand, Castellanos-Ryan, O'Leary-Barrett, Sully and Concord (2013) validated the Substance Use Risk Profile Scale (SURPS) in adolescents (13-14 years). This measures personality risk factors for substance abuse and other adolescent behavioural problems. Tests of concurrent and predictive validity showed that all scales are theoretically related to substance use and other emotional and behavioural problems. Subscales enabled identifying adolescents "at risk": those who developed problems in large number (high sensitivity scores from 72 to 91%). Good specificity for individual personality subscales was obtained. Likewise Robles-García et al. (2014) validated the Spanish translation of the Substance Use Risk Profile Scale (SURPS) in adolescents (11-17 years) to determine personality behaviours as risk factors that predict future substance abuse. All subscales showed Cronbach's alpha coefficients from .61 to .66; with the exception of the Introversion/Hopelessness (scale .83). A limitation of these scales is their partial use in the evaluation of drugs whether legal or illegal, focusing on personality features without dealing with certain problem behaviours.

The Government Delegation for the National Drug Plan –DGPNSD– (2014) in Spain sponsors a National Survey on Drug Use in Secondary School Students ranging from ages 14 to 18 -ESTUDES-. This instrument has been used, with few modifications, for biennial national reports which enable observation of trends over time. The survey and methodology were similar to those in other countries European Union countries and the United States, allowing international comparisons. Consequently, the objective of this study was psychometric study of a scale based on the ESTUDES survey to detect adolescent substance use, health consequences and challenging behaviours in educative contexts.

METHOD

Participants

The sample was made up for 1.264 students in compulsory secondary education; 49.2% were men, and 83.5% were Spanish nationals.

Table 1. Socio-demographic characteristics of participants

		Frequency(%)	
Grade	1° ESO	354(28%)	
	2° ESO	203(16%)	
	3° ESO	298(23.6%)	
	4° ESO	409(32.4%)	
Ownership	State	837(66.2%)	
	Private /semi-private	427(33.8%)	
Geographical scope	Urban	920(72.8%)	
	Rural	344(27.2%)	
Gender	Male	622(49.2%)	
	Female	642(50.8%)	
Interval Age	11-13 years	345(27.2%)	
	14-15 years	635(50.2%)	
	16-18 years	284(22.7%)	
Years repeating course	One	338(26.8%)	
	Two	109(8.6%)	
	None	816(64.6%)	
Origin	Spanish	1056(83.5%)	
	Foreign	208(16.5%)	
Number of siblings	None	126(10%)	
	One	639(50.8%)	
	2-4	440(35%)	
	5-8	46(3.7%)	
	More than 8	7(.6%)	
Money spent in the last 30 days	Until 30€	890(72.2%)	
	30-60€	209(17%)	
	60-100€	72(5.8%)	
	More than 100€	62(5%)	
Employment status of parents	Housewife	Father	Mother
	Employed	22(1.7%)	384(30.5%)
	Unemployed	1007(79.9%)	774(61.4%)
	Retiree	111(8.8%)	60(4.8%)
	N/A	47(3.7%)	15(1.2%)
		74(5.9%)	28(2.2%)
Parents' Educational Level	No studies	87(6.9%)	103(8.2%)
	Primary School	301(24%)	311(24.7%)
	Secondary	252(20.1%)	277(22%)
	Bachelor	90(7.2%)	105(8.3%)
	Bach. Degree	178(14.2%)	162(12.9%)
	N/A	348(27.7%)	300(23.8%)
Cohabits with		Yes(%)	No(%)
	Mother	1221(97%)	38(3%)
	Father	1045(83.4%)	208(16.6%)
	Brothers	1029(82.6%)	217(17.4%)
	Grandparents	193(15.8%)	1027(84.2%)
	Partner	14(1.2%)	1201(98.8%)
	Other family	105(8.6%)	1113(91.4%)
	No family	48(3.9%)	1170(96.1%)
Missed class in previous 30 days		555(45.2%)	673(54.8%)

The age range was between 11 and 18 years old ($M = 14.41$, $SD = 1.43$), and they attended public and private schools in different geographical areas of the Region of Murcia (rural and urban). The inclusion criteria used were: students in compulsory secondary education, ages between 11 and 18 years. The exclusion criteria were: non-attendance the day the questionnaire was passed out, language problems to fully understand the instruments and not complete all instruments. Therefore, out of the 1.480 total students, 216 were excluded. Complete participant characteristics are shown in Table 1.

Instruments

Nineteen dichotomous items were chosen from the “National Survey on Drug Use in Secondary School Students (ESTUDES)” draft by the DGPNSD (2008) to form the instrument on drug use and other behaviours. Our adaptation (Cerezo, Méndez, & Rabadán, 2009) resulted in a scale of 82 items, which included variables related to socio-demographic and academic characteristics (age, sex, country of origin, number of siblings, education and employment status of parents, truancy habits and weekly allowance for personal expenses), legal and illegal drug use and antisocial behaviours as getting involved in personal fights. For this reason, out of 82 the 19 items were chosen (see Table 2) to form the instrument on drug use and other behaviours.

FRIDA - Interpersonal Risk Factors for Drug Use in Adolescence (Secades et al., 2006) - was selected to assess the concurrent validity. It consists of 90 Likert type items rated on a seven point scale, and it measure seven factors: Family reaction against drug consumption, Peers, Access to drugs, Family risks, Family education about drugs, Family protective activities, and Parental educational styles. Cronbach’s alpha coefficient was .925 for total scores. In this study, internal consistency coefficient was .81.

Procedure

This is a transversal descriptive research. Authorization was requested from the Department of Education, Training and Employment in the Region of Murcia. A sample of the student population from secondary schools was selected. The selection of the participant schools was determined by their acceptance to take part in the study. An interview with the school

principals and/or career advisers was carried out to explain the objectives of and instruments used in this study. The selection of subjects was based on the inclusion criteria mentioned. Data confidentiality was maintained at all times.

Statistical Analysis

Firstly, an exploratory study was carried out with all the data of the sample analysing the distribution of the same, in this way the outlaw cases were detected and the parametric assumptions were verified. Next, an item analysis to study the homogeneity of the items with total score was performed. Then, an exploratory factor analysis (EFA) on tetrachoric correlations to explore the structure of the questionnaire with MPLUS (Muthén, & Muthén, 1998-2007) using robust weighted least-square method (WLMSV) was performed. Goodness of fit statistics $RMSEA < .08$, $CFI > .95$, $TLI > .95$ and $SRMR < .08$ were used to select the representative factors. The resulting factors were rotated with Geomin oblique method.

For the analysis of socio-demographic variables, a descriptive analysis (frequencies and percentages, mean and standard deviation) were used. Evidence of empirical validity was obtained with Pearson correlation with SPSS 19.0. All analysis was performed with SPSS 19.0, except EFA.

RESULTS

An analysis of items including descriptive statistics and corrected item-total correlation was performed (Table 2). Most items obtained a very low average, showing that drug use was relatively low, especially that of illegal drugs. The homogeneity indexes of items revealed that most were in line with overall consumption, obtaining values between .30 and .70 (Crocker, & Algina, 1986).

The Bartlett statistics, $Bartlett (190) = 4269.1$, $p < .001$, and KMO index, $KMO = .82$, were good indicators that matrix of tetrachoric correlations could be subjected to EFA. Then EFA achieved two factors which pattern

matrix and structure and factor loadings for the items shown in Table 3.

Table 2. Descriptive statistics and item-total correlation of questionnaire

	Mean	SD	Skewness	Kurtosis	Item-total correlation
11	.44	.50	.27	-1.94	.48
12	.68	.47	-.77	-1.44	.37
13	.07	.26	3.29	8.83	.17
14	.16	.36	1.83	1.36	.50
15	.01	.11	8.46	69.42	.29
16	.01	.08	11.73	135.56	.25
17	.01	.10	9.35	85.37	.27
18	.02	.11	7.57	55.25	.24
19	.01	.08	11.12	121.51	.22
110	.02	.13	7.22	50.02	.17
111	.02	.13	6.50	40.20	.16
112	.21	.41	1.41	-.01	.34
113	.050	.22	3.96	13.66	.25
114	.32	.46	.79	-1.376	.32
115	.06	.23	3.80	12.39	.11
116	.03	.16	5.59	29.22	.23
117	.06	.22	3.92	13.39	.21
118	.74	.43	-1.07	-.86	.05
119	.15	.36	1.93	1.73	.20

Each factor was composed of items with a factorial loading $> .30$. The first factor obtained an eigenvalue of 8.61 (43.1% of explained variance) and the second obtained an eigenvalue of 2.08 (10.4% of explained variance). The total variance explained by two factors was 58.3%. Factor I is made up of items 3, 4, 5 to 13, 17 and 19, referred to as substance abuse and health consequences. Factor II consists of items 1, 2, 4, 14 and 16, which we call use of legal drugs and challenging behaviours. The correlation between two factors was .53. Cronbach's alpha reliability coefficient for total scale scores was .70.

Concurrent validity was estimated with correlation between the new scale and subscales of FRIDA (Table 4).

Table 3. Factorial structure based on ESTUDES questionnaire

	Matrix pattern		Matrix structure	
	Factor I	Factor II	Factor I	Factor II
1. Have you ever smoked a cigarette?	.01	.91	.49	.91
2. Have you ever drunk alcohol?	-.09	.84	.36	.78
3. Have you ever taken tranquilizers or sleeping pills (pills to calm nerves, relax, sleep better) without prescription?	-.31	.19	.41	.36
4. Have you ever consumed hashish or marijuana (cannabis, grass, weed, joints, dope or hash oil)?	.45	.61	.77	.84
5. Have you ever used cocaine powder (coke, candy cane, cocaine hydrochloride) or freebased cocaine (base cocaine paste, basuco, crack, baseball)?	.86	.18	.95	.63
6. Have you ever used ecstasy (Molly, biscuit)?	.95	.05	.98	.54
7. Have you ever used speed or amphetamines (meth, crank)?	.89	.11	.95	.58
8. Have you ever used hallucinogens (LSD, acid, boomers, magic mushrooms, mescaline, ketamine, special-k, ketolar, Imalgene)?	.90	-.03	.89	.44
9. Have you ever used heroin (dope,junk)?	.96	-.01	.95	.49
10. Have you ever used any volatile inhalants (glue, adhesive, solvents, poppers, nitrites, petrol)?	.76	-.21	.65	.19
11. Have you consumed other drugs?	.81	-.09	.76	.34
12. In the last 12 months, have you participated in any fighting or either suffered or initiated any physical assault?	.46	.16	.55	.40
13. In the last 12 months, have you been arrested by the police or civil guard?	.67	.04	.69	.39
14. Have you had a major conflict or argument with parents or siblings?	.06	.49	.31	.52
15. Have you suffered a burglary or a robbery?	.24	.12	.30	.24
16. Have you run away from home for more than a day?	.25	.45	.49	.58
17. Have you been expelled from school for a full day or more?	.40	.21	.51	.42
18. Do you believe you are sufficiently informed about drugs?	-.11	.16	-.02	.11
19. Do you think that you carry out activities that put your health at risk?	.51	-.07	.48	.20

Note: The factors have been defined with factor loadings in bold type.

Table 4. Pearson's correlation between Frida test factors and Factors I and II

	3	4	5	6	7	8	9	10
1	.12***	-.01	-.09**	.03	-.01	.03	.03	.01
2	.30***	.29***	-.29***	.07**	.06*	-.06*	.25***	.11***

Note: 1: Factor I; 2: Factor II; 3: Family reaction against drug consumption; 4: Peers; 5: Access to drugs; 6: Family risks; 7: Family education about drugs; 8: Family protective activities; 9: Parental educative style. 10: Global Vulnerability Index.

***p < .001; **p < .01; *p < .05.

All correlations were low or very low. However, Factor II had moderate and positive correlations with Family reaction against drug consumption (p < .001), Peers (p < .001), Parental educative stile (p < .001) and vulnerability index (p < .001), and negative correlation with Access to drugs (p < .001). However, Factor I

correlated significantly with Family reactions against drug consumption but the correlation was lower.

DISCUSSION AND CONCLUSIONS

The scales to evaluate consumption in adolescents is their partial use in the evaluation of drugs whether (legal or illegal), focusing on personality features without dealing with certain problem behaviours (Camacho et al., 2013; Castellanos-Ryan, et al., 2013; Fernández-Artamendi et al., 2012; Robles-García et al., 2014). For this purpose, this paper presents the psychometric study of a scale based on the ESTUDES (2008) to detect adolescent substance use and health consequences and challenging behaviours in educative contexts. The psychometric analysis shows that this scale is a short tool to detect drug use among adolescents. It included nineteen dichotomous items about drug consumption and other behaviours. EFA has found two factors associated to legal and illegal drugs, one based on substance abuse and health consequences and the second based on legal drugs consumption and challenging behaviours.

Concurrent validity with FRIDA showed the importance of Family reaction against drug consumption and access to drugs, as well as problem behaviours like having a major conflict with parents or siblings or being involved in a physical fight, which contrasted with FRIDA factors: Family reaction against drug consumption, Peers, Access to drugs, Family risks, Family education about drugs, Family protective activities, Parental educative styles and Global Vulnerability Index. Thus, family and school, and especially peers, play a key role in prevention programs (EMCDDA, 2015; Espada, González, Orgilés, Lloret, & Guillén-Riquelme, 2015; UNODC, 2015).

Moreover, drug use has been associated with family problems due to arguments with parents or siblings, and socially, due to having been involved in a physical fight or having suffered or initiated physical aggression, making contextualized preventive intervention more necessary (UNODC, 2015).

As limitations of the study it is possible to mention the fact of having used the self-administered questionnaire. As a prospective of this work, we would like to point out interest in carrying out longitudinal studies on drug use and problem behaviours. Hence, prospective longitudinal studies should be done to collect information from teachers and family.

REFERENCES

- Camacho, L., Mezquita, L., Ibáñez, M. I., Moya, J., Villa, H., Viruela, A. M., & Ortet, G. (2013). Spanish adaptation of the Expectancy Questionnaire (EQ) about alcohol effects in adolescents. *Psicothema*, 25(4), 529-535.
- Castellanos-Ryan, N., O'Leary-Barrett, M., Sully, L., & Conrod, P. (2013). Sensitivity and specificity of a brief personality screening instrument in predicting future substance use, emotional, and behavioral problems: 18-month predictive validity of the Substance Use Risk Profile Scale. *Alcoholism, Clinical and Experimental Research*, 37 Suppl 1, E281-E290.
- Cerezo, F., Méndez, I., & Rabadán, R. (2009). *Encuesta para Estudiantes de Enseñanzas Secundarias*. [Survey for Secondary School Students]. Unpublished document.
- Crocker, L., & Algina, J. (1986). *Introduction to classical and modern test theory*. New York: Holt, Rinehart and Winston.
- Delegación del Gobierno para el Plan Nacional sobre Drogas (DGPNSD) (2008). Encuesta estatal sobre uso de drogas (ESTUDES) 2008 [National Survey on Drug Use in Secondary School Students (ESTUDES)]. Madrid: Secretaría de Estado de Servicios Sociales e Igualdad. Retrieved from: <http://www.pnsd.msssi.gob.es/Categoria2/observa/pdf/CuestionarioEstudes2008.pdf>
- Delegación del Gobierno para el Plan Nacional sobre Drogas (DGPNSD) (2014). Encuesta estatal sobre uso de drogas (ESTUDES) 2012/2013 [National survey about drugs use (ESTUDES) 2012/2013]. Madrid: Secretaría de Estado de Servicios Sociales e Igualdad. Retrieved from: <http://www.pnsd.msssi.gob.es/>
- Delegación del Gobierno para el Plan Nacional sobre Drogas (DGPNSD) (2016). Informe 2016. Alcohol, tabaco y drogas ilegales en España. Madrid: Secretaría de Estado de Servicios Sociales e Igualdad. Recuperado desde: http://www.pnsd.msssi.gob.es/profesionales/sistemasInformacion/sistemaInformacion/pdf/2016_Informe_ESTUDES.pdf
- Espada, J. P., González, M. T., Orgilés, M., Lloret, D., & Guillén-Riquelme, A. (2015). Meta-analysis of the effectiveness of school substance abuse prevention programs in Spain. *Psicothema*, 27(1), 5-12.
- European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) (2015). *European Drug Report. Trends and developments 2015*. Luxembourg: Publications Office of the European Union. Retrieved from: <http://www.emcdda.europa.eu/publications/edr/trends-developments/2015>
- Fernández-Artamendi, S., Fernández-Hermida, J. R., García-Cueto, E., Secades-Villa, R., García-Fernández, G., & Barrial-Barbén, S. (2012). Adaptación y validación española del Adolescent-Cannabis Problems Questionnaire (CPQ-A) [Spanish adaptation and validation of The Adolescent-Cannabis Problems Questionnaire (CPQ-A)]. *Adicciones*, 24(1), 45-50
- Muthén, L. K., & Muthén, B. O. (1998-2007). *Mplus user's guide. Fifth edition*. Los Angeles, CA: Muthén & Muthén.

Robles-García, R., Fresán, A., Castellanos-Ryan, N., Conrod, P., Gómez, D., de Quevedo y Domínguez, M. E., ... Medina-Mora, M. E. (2014). Spanish version of the substance use risk profile scale: Factor structure, reliability, and validity in Mexican adolescents. *Psychiatry Research*, 220(3), 1113-1117.

Secades, R., Carballo, J. L., Fernández-Hermida, J. R., García, O., & García, E. (2006). *Cuestionario de factores de riesgo interpersonales para el consumo de drogas en adolescentes (FRIDA)* [Interpersonal Risk Factors for Drug Use in Adolescence-FRIDA]. Madrid: TEA.

United Nations Office on Drugs and Crime -UNODC- (2015). *World Drug Report*. United Nations publication: Vienna. Retrieved from: https://www.unodc.org/documents/wdr2015/World_Drug_Report_2015.pdf