

# Uso de alcohol y tabaco y variables cognitivo-motivacionales en el ámbito escolar: Efectos sobre el rendimiento académico en adolescentes españoles

## Alcohol and tobacco use and cognitive-motivational variables in school settings: Effects on academic performance in Spanish adolescents

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### Resumen

El objetivo de este estudio fue analizar: (a) la relación entre el consumo de tabaco y alcohol y el rendimiento académico y (b) la capacidad predictiva de los factores psicoeducativos y el abuso de alcohol y tabaco sobre el rendimiento académico en una muestra de 352 adolescentes españoles de 2º a 4º de Educación Secundaria Obligatoria (ESO). Para analizar las variables cognitivo-motivacionales se utilizaron el Self-Description Questionnaire-II, la Sydney Attribution Scale y el Achievement Goal Tendencies Questionnaire. El consumo abusivo de alcohol y tabaco, el sexo y la repetición de curso fueron también evaluados utilizando medidas autoinformadas. El rendimiento académico fue evaluado a partir de los registros escolares. Se utilizaron análisis de frecuencias y regresión logística para analizar los datos. Los análisis de frecuencias revelaron que los estudiantes que abusan del tabaco y el alcohol presentan un rendimiento académico más pobre. Los análisis de regresión logística destacaron que los comportamientos saludables así como las variables educativas y cognitivo-motivacionales ejercieron un efecto predictivo diferente sobre el rendimiento académico dependiendo del área académica analizada. Estos resultados señalan que para mejorar el rendimiento académico en la adolescencia se han de tener en consideración no sólo variables académicas sino también variables relacionadas con la salud.

**Palabras clave:** alcohol, tabaco, variables cognitivo-motivacionales, rendimiento académico.

### Abstract

The aim of the present study was to analyze: (a) the relationship between alcohol and tobacco use and academic performance, and (b) the predictive role of psycho-educational factors and alcohol and tobacco abuse on academic performance in a sample of 352 Spanish adolescents from grades 8 to 10 of Compulsory Secondary Education. The Self-Description Questionnaire-II, the Sydney Attribution Scale, and the Achievement Goal Tendencies Questionnaire were administered in order to analyze cognitive-motivational variables. Alcohol and tobacco abuse, sex, and grade retention were also measured using self-reported questions. Academic performance was measured by school records. Frequency analyses and logistic regression analyses were used. Frequency analyses revealed that students who abuse of tobacco and alcohol show a higher rate of poor academic performance. Logistic regression analyses showed that health behaviours, and educational and cognitive-motivational variables exert a different effect on academic performance depending on the academic area analyzed. These results point out that not only academic, but also health variables should be address to improve academic performance in adolescence.

**Key Words:** alcohol, tobacco, cognitive-motivational variables, academic performance.

Academic performance is an important issue in our society as it prepares adolescents for their incorporation into adult life. A distressing situation appears when figures of the last inform of Programme for International Student Assessment (PISA) are analyzed. PISA report showed that a high rate of Spanish students got a very poor competence level in reading, maths, and sciences, which means that a significant proportion of students do not achieve the aptitudes and knowledge needed in the academic context (Organization for Economic Cooperation and Development, OECD, 2010). Those results added to a high rate of early drop out without achieving Compulsory Secondary Education diploma could make the incorporation of adolescents to workforce more difficult, because training level is positively related to working activity and negatively to unemployment (Ministerio de Educación y Ciencia, 2011). Therefore, it seems essential to identify risk and protective factors involved in academic performance of adolescents, minimizing the influence of the former and maximizing the influence of the latter. Here appears the necessity of attending to the use of drugs as a risk factor for other personal problems, that is, for academic failure.

In Spain, alcohol and tobacco are the most consumed drugs in adolescence (Observatorio Español de la Droga y la Toxicomanía, 2011), being alcohol abuse more frequent among males and tobacco abuse more common among females (Moral, Rodríguez, & Sirvent, 2005). Although it has been broadly demonstrated that low academic performance contributes to such non-healthy behaviours (Henry, 2010; Morin, Rodríguez, Fallu, Mañano, & Janosz, 2012), the reverse influence has much less empirical support. Those studies that analyze the relation between alcohol and tobacco use and academic performance found that abusive alcohol consumption and frequent tobacco use produced negative and statistically significant effects on the academic performance of adolescents (Cox, Zhang, Johnson, & Bender, 2007; Jeynes, 2002). Recent studies also found that substances use in adolescence was not only related to decreases in academic performance but also implied a higher probability of grade retention and truancy (Dhavan, Stigler, Perry, Arora, & Reddy, 2010; Pathammayong et al., 2011).

Those data reinforce the idea of considering the predictive power of alcohol and tobacco abuse on academic performance in adolescence. However, it is also necessary to take into account, together with drugs use, other personal and educational variables in order to know if the predictive effect of drugs on academic performance is masked by those variables. Thus, cognitive-motivational variables (i.e., academic self-concept, academic goals, and academic self-attributions), personal variables (i.e., sex and age) and grade retention will be also analyzed as predictors of academic performance in the present research.

Cognitive-motivational variables have been profusely studied as determinants of academic performance. In this line, previous research has revealed the predictive power of academic self-concept (González-Pienda et al., 2002; Guay, Marsh, & Boivin, 2003; Miñano, Castejón, & Gilar, 2012; Miñano, Gilar, & Castejón, 2012; Risso, Peralbo, & Barca, 2010; Valle et al., 2003), academic goals (Inglés et al., 2009, Valle et al., 2003) and academic self-attributions (Chan & Moore, 2006; Valle et al., 2003) on academic achievement of adolescents and undergraduates. Grade retention has also been related to academic

performance. Thus, Jimerson and Ferguson (2007) found that grade retention was an important explanatory factor of academic performance in adolescence.

Attending to personal variables, studies that analyze the relation between gender and academic performance in secondary education students point out that female gender appeared as a promoting factor of high performance (Owens, Shipee, & Hensel, 2008; Tinklin, 2003). Nevertheless, results concerning age and grade level are unclear. Thus, Cox et al. (2007) found that adolescents in upper grades (12<sup>th</sup>) got higher academic grades than students in lower grades (10<sup>th</sup>). However, when grade was taken as an explanatory predictor variable of academic achievement no influence was found.

As far as we know, the number of studies that analyse all these personal and academic variables together with alcohol and tobacco use is scarce. In this sense, Musgrave-Marquart, Bromley and Dalley (1997) found, in a sample of 161 American undergraduates, that nicotine use was a significant negative predictor of GPA while no relation was found for academic attribution. Fleming et al. (2005) also tackled academic performance attending to both drug use and academic variables in a sample of 576 American adolescents. In order to analyze academic variables, Fleming et al. (2005) used "school bonding" (bonding to school and commitment to school) which appeared not to be related to achievement test scores, while alcohol and cigarettes use were related to academic performance even when the influence of other variables was partially out.

## The present research

Although previous research has suggested the relation between some variables considered in this study and academic performance, several limitations have been found. In this line, despite there are some studies that analyze the relationship between cognitive-motivational variables and alcohol and tobacco use or abuse (Martínez-Lorca & Alonso-Sanz, 2003; Vaughan, Corbin, & Fromme, 2009; Wormington, Anderson, & Corpus, 2012), there are few studies in which those variables are taken together to explain academic performance. In addition, studies that analyze those variables together were conducted using non-Spanish populations. As the influence of culture on behaviour is evident (Páez, Fernández, Basabe, & Grad, 2001), findings in non-Spanish population may show a pattern of influence on academic achievement that not necessarily reflects Spanish adolescents functioning. Furthermore, although the influence of school performance in drugs use has already been studied in Spain (Arbinaga, 2002) the reverse direction has not been analysed yet in our country. This situation appears surprising as international results support the influence of alcohol and tobacco abuse on academic performance in students of secondary education (Cox et al., 2007; Jeynes, 2002). Bearing in mind such limitations, the present study was designed to contribute to the explanation of academic performance in Spanish students of compulsory secondary education. Specifically, the purposes of this study were: (a) to examine the relationship between alcohol and tobacco abuse and academic performance, and; (b) to analyze the predictive effect of healthy behaviours (i.e. non-tobacco and non-alcohol abuse), cognitive-motivational varia-

bles (i.e. academic self-concept, academic goals, and academic self-attributions), sex, grade level, and grade retention on academic performance in a sample of Spanish adolescent.

## Method

### Participants

Students of Compulsory Secondary Education (ESO) of the city of Elche (Alicante) during the 2008-2009 academic year formed the reference population. According to the school census, a total of 9231 students were matriculated in 18 schools; 7642 of them enrolled in 13 public schools and 1589 in five private schools. To carry out that cross-sectional study two public and two private high schools were randomly selected in the city of Elche (Alicante). Once high schools were chosen, one class randomly selected for each grade (8<sup>th</sup>, 9<sup>th</sup> and 10<sup>th</sup>), which resulted in an estimated participation of 93 students per centre.

Sample recruited was composed by 371 students of ESO. Of this total, 19 students (5.12%) were excluded because their answers were incomplete or their parents did not give their informed written consent for them to participate. The final sample was composed by 352 students (50.9% boys). Ages ranged from 12 to 16 years ( $M = 14.65$ ;  $SD = 1.08$ ). The average age of the reference population was 14.01. Distribution of the sample according to grade and sex was: 79 (44 boys and 35 girls) in grade 8, 134 (72 boys and 62 girls) in grade 9, and 139 (63 boys and 76 girls) in grade 10. Chi-square was used to test for the homogeneity of the sample according to sex and grade. No significant differences were found ( $\chi^2_{(2)} = 2.88$ ;  $p = .23$ ). For a confidence level of 95% the sampling error was 5.2%.

### Instruments and variables

#### *Self-Description Questionnaire II (SDQ-II, Marsh, 1992)*

The SDQ-II is a 102-item self-report measure designed to assess 11 self-concept factors, although in this study only the three academic self-concept scales were used: Math (M), Verbal (V), and General School (GS). Each scale is composed of 8 or 10 items. The items are scored in a 6-point Likert scale (1 = false; 6 = true). In the present study, internal consistency coefficients (Cronbach's alpha) were .91, .84 and .89 for M, V and GS, respectively, similar to those obtained by Inglés et al. (2012) in the Spanish validation of this instrument. The average administration time was 40 minutes.

#### *Achievement Goal Tendencies Questionnaire (AGTQ, Hayamizu & Weiner, 1991)*

The AGTQ is a self-report measure comprising 20 items, designed to measure three academic goal tendencies: Learning Goals (LG), Social Reinforcement Goals (SRG); and Performance Goals (PG). Students rate each item on a 5-point Likert

scale (1 = never; 5 = always). Internal consistency coefficients (Cronbach's alpha) in this study were: .77, .74 and .70 for LG, SRG and PG, respectively, similar to those obtained by Inglés et al. (2009) in the Spanish validation of the AGTQ. The average administration time was 10 minutes.

#### *Sydney Attribution Scale (SAS, Marsh, Cairns, Relich, Barnes, & Debus, 1984)*

The SAS is a 72-item multidimensional scale to measure causal perceptions of academic success and failure. Students rate each item on a 5-point Likert scale (1 = false; 5 = true). The questionnaire combines: (a) two academic areas (Mathematics, Verbal); (b) two hypothetical outcomes (Success, Failure); and (c) three types of causes (Ability, Effort, External Causes). The scales derived for those combinations are: Math Success Ability (MSA), Effort (MSE) and External Causes (MSEC); Math Failure Ability (MFA), Effort (MFE) and External Causes (MFEC); Verbal Success Ability (VSA); Effort (VSE) and External Causes (VSEC); Verbal Failure Ability (VFA), Effort (VFE) and External Causes (VFEC). Furthermore, the scales without specifying the academic area are: Success Ability (SA), Effort (SE), and External Causes (SEC); Failure Ability (FA), Effort (FE); and External causes (FEC). For the present study, internal consistency coefficients (Cronbach's alpha) ranged between .56 and .87 for success scales and between .54 and .85 for failure scales. Those coefficients are similar to those informed in the Spanish validation of the SAS (Inglés, Rodríguez-Marín, & González-Pienda, 2009) and the original version of the scale (Marsh et al., 1984). The average administration time was 45 minutes.

#### *Alcohol and tobacco abuse.*

These variables were measured asking students whether they had been under the influence of such drugs. In the case of alcohol, it was used the question "have you ever been drunk last month?", as binge drinking has been identified as a problematic pattern of alcohol use in Spanish adolescents (Calafat, 2007). Tobacco abuse was assessed using the following question: "how often do you smoke?"

#### *Academic performance.*

Academic performance in mathematics and Spanish language was measured using school records.

### Procedure

Questionnaires were answered collectively in the classroom. Parents' written authorization was compulsory to participate in the study. Research assistants informed students that their participation was strictly voluntary but tried to motivate adolescents to participate. Instructions were read aloud, stressing the importance of answering each question. Responses were filled out in answer sheets. Research assistants (postgraduate students specifically trained for this purpose) applied and super-

vised the administration of the questionnaires. Assessment battery was administered in two sessions in February (each session lasted approximately one hour). Scales presentation order was randomly established for each group of students.

## Data Analysis

In order to analyze the frequencies and percentages of high and low academic performance in adolescents who abuse of tobacco and alcohol, frequency analyses were used. Alcohol abuse was dichotomized in non-alcohol abuse (none binge drinking session in last month) and alcohol abuse (at least one binge drinking session in last month), whereas tobacco abuse was dichotomized as daily-smoking (defined at least as "some cigarettes nearly every day") and non-daily smoking. Furthermore, mathematics and Spanish language grades were dichotomized as high academic performance (scores of eight or above) or low academic performance (score of six or below). General academic success was assessed using the number of subjects failed on the past semester. The variable was dichotomized as high performance (non-failed subjects) and low performance (three or more failed subjects).

Before logistic regression analyses were performed, correlations among predictor variables were examined. Results showed that these correlations were lower than .70, showing that no multicollinearity appeared among the variables analyzed (Tabachnick & Fidell, 1996). Logistic regression analyses were conducted to analyze the predictive role of academic goals, academic self-concept, academic self-attributions, tobacco and alcohol abuse, sex, grade level, and grade retention on Spanish and mathematics success and on general academic success. SPSS statistical 18.00 was used to perform analyses.

## Results

### Descriptive statistics for alcohol and tobacco use and academic performance

Table 1 shows the frequencies and percentages of alcohol and tobacco use and academic performance (in mathematics, Spanish and also the general performance) by sex and grade level. Results for the total sample are also included.

Alcohol abuse (15.3%) was more frequent than tobacco abuse (9.9%). Furthermore, while the proportion of boys (7.4%) and girls (7.7%) is similar with respect to alcohol abuse, the proportion of girls who smoke daily (6%) is higher than the proportion of boys (4%). Regarding academic grade level the abuse of alcohol and tobacco increases gradually with the academic year. Thus, alcohol consumption increased from 2.3% (Grade 8) to 9.6% (Grade 10), while the consumption of tobacco increased from 0.6% (Grade 8) to 7.1 (Grade 10).

Regarding academic grades, 15.9% of the total sample show high performance in math (score of eight or above), while the percentage of students who reach high performance in Spanish is slightly lower (14.8%). Moreover, the proportion of boys with

high performance in mathematics (8.2%) is somewhat higher than the proportion of girls with high performance in this subject (7.7%). However, the proportion of girls with high performance in Spanish (8.2%) is higher than the proportion of boys with high performance in this subject (6.5%). With regard to academic year, the highest achievement in mathematics (7.1%) and Spanish (7.7%) occurs in Grade 9.

According to general academic performance, more than half of the students (55.7%) passed all subjects (high general academic performance). In addition, more girls (29.3%) than boys (26.4%) show high general academic performance. Regarding academic year, have passed all subjects is more frequent in Grade 10 (26.6%) than in Grade 9 (18.5%) and Grade 8 (11.6%).

### Relation between alcohol and tobacco abuse and academic performance

All daily-smoking students showed low academic performance (100%). Similar results were found regarding alcohol abuse. In this case, 85.7% of binge-drinkers showed low academic performance, whereas only 14.3% of those alcohol abusers achieved high grades. Significant statistically differences were found between alcohol abusers with high and low academic performance. Thus, adolescents who get drunk at least once last month showed more often low grades than high grades ( $Z = 6.54$ ;  $p < .005$ ). The effect size ( $d = .54$ ) revealed that the magnitude of this difference was moderate.

Table 1. Descriptive statistics for alcohol and tobacco use and academic performance

	Boys n (%)	Girls n (%)	Grade 8 n (%)	Grade 9 n (%)	Grade 10 n (%)	Total n (%)
<b>Alcohol use</b>						
Non-alcohol abuse	153 (43.5%)	146 (41.5%)	72 (20.3%)	122 (34.7%)	105 (29.7%)	299 (84.7%)
Alcohol abuse	26 (7.4%)	27 (7.7%)	8 (2.3%)	12 (3.4%)	33 (9.6%)	53 (15.3%)
<b>Tobacco use</b>						
Non-tobacco abuse	165 (46.9%)	152 (43.2%)	77 (21.9%)	126 (35.8%)	114 (32.4%)	317 (90.1%)
Tobacco abuse	14 (4.0%)	21 (6.0%)	2 (.6%)	8 (2.3%)	25 (7.1%)	35 (9.9%)
<b>Mathematics</b>						
Low performance	126 (35.8%)	124 (35.2%)	55 (15.6%)	97 (27.6%)	98 (27.8%)	250 (71.0%)
High performance	29 (8.2%)	27 (7.7%)	15 (4.3%)	25 (7.1%)	16 (4.5%)	56 (15.9%)
<b>Spanish language</b>						
Low performance	136 (38.6%)	118 (33.5%)	64 (18.2%)	94 (26.7%)	96 (27.3%)	254 (72.2%)
High performance	23 (6.5%)	29 (8.2%)	10 (2.8%)	27 (7.7%)	15 (4.3%)	52 (14.8%)
<b>General academic performance</b>						
Low	56 (15.9%)	44 (12.5%)	21 (6.0%)	52 (14.8%)	27 (7.7%)	100 (28.4%)
High	93 (26.4%)	103 (29.3%)	41 (11.6%)	65 (18.5%)	90 (25.6%)	196 (55.7%)

## Logistic regression analyses

Table 2 presents the OR derived from logistic regression models that explain the probability of getting high academic performance in Spanish language and mathematics using as predictive factors non-alcohol abuse, non-daily smoking, female sex, grade level, and non grade retention. Scores on academic variables: (a) SDQ-II (M, V and GS); (b) AGTQ (LG, SRG and PG), and; (c) SAS (MSA, MSE, MSEC, MFA, MFE, MFEC, VSA, VSE, VSEC, VFA, VFE and VFEC) were also included in the models as predictive factors. Same variables were used to explain general academic performance except from SAS scores, for which general scale scores were used (i.e., SA, SE, SEC, FA, FE, and FEC).

The Hosmer-Lemeshow test exceeded the value of 0.5 in all models analyzed, supporting the goodness of fit of the models to the data. The model created for high academic performance in Spanish language allowed a correct estimation of 81.7% ( $\chi^2_{(5)} = 109.88, p = .00$ ). Nagelkerke's  $R^2$  was .49. The OR revealed that the probability of getting high academic performance in Spanish increased: (a) 17.47 times when the student had not been retained; (b) 2.29 times for female students; (c) 2.96 times for students in 10th grade compared to 9th grade; (d) 1.13 times every time the score on the GS scale increased one point, and; (e) 2.02 times every time the score on the VSEC scale increased one point (see Table 2).

Table 2. Results derived from the Logistic Regression for the probability of achieving academic success in Spanish, Mathematics, and General Academic performance

Predictors	B	SE	Wald	p	OR	95% CI
Spanish language performance						
Non-retained	2.86	1.07	43.47	.008	17.47	2.12-143.70
Female sex	.83	.36	5.38	.020	2.29	1.14-4.62
9 <sup>th</sup> grade vs. 10 <sup>th</sup> grade	1.09	.42	6.82	.009	2.96	1.31-6.70
GS	.12	.02	39.14	.000	1.13	1.08-1.16
VSEC	.70	.27	6.87	.009	2.02	1.19-3.43
Constant	-11.52	1.73	44.42	.000	.000	
Mathematics performance						
GS	.13	.02	34.18	.000	1.14	1.09-1.19
MSA	.53	.23	5.22	.022	1.70	1.08-2.67
MFA	-.77	.27	8.51	.004	.46	.27-.78
LG	.14	.04	12.85	.000	.86	.80-.94
Non-alcohol abuse	1.49	.60	6.21	.013	4.43	1.37-14.27
General academic performance						
V	-.06	.02	5.92	.015	.95	.90-.99
GS	.14	.02	39.50	.000	1.15	1.10-1.20
Non-daily smoking	2.52	.85	8.82	.003	12.41	2.35-65.45
Non-retained	1.89	.48	15.62	.000	6.65	2.60-17.02
Female sex	1.09	.39	7.85	.005	2.98	1.39-6.38
9 <sup>th</sup> grade vs. 10 <sup>th</sup> grade	-1.55	.39	15.62	.000	.21	.09-.46
FA	-4.46	1.57	8.10	.008	.69	.53-.91

Note. B: regression coefficient; SE: standard error; OR: odds ratio; CI: confidence interval. GS: General School self-concept scale; VSEC: Verbal Success External Causes scale; MSA: Math Success Ability scale; MFA: Math Failure Ability scale; LG: Learning Goals scale; V: Verbal self-concept scale; FA: Failure Ability scale.  $P < .005$ .

The model generated for high academic performance in mathematics allowed a correct estimation of 81.5% ( $\chi^2_{(5)} = 128.65, p = .00$ ). Nagelkerke's  $R^2$  was .55. The OR indicated that the probability of getting high academic performance in mathematics increased: (a) 4.43 times if the student was not an alcohol-abuser; (b) 1.14 times every time that the score on GS scale increased one point; (c) 1.70 times every time that the score on MSA scale increased one point; (d) .86 times every time that the score on LG scale increased one point; and (e) .46 times every time that the score on MFA scale increased one point (see Table 2).

Finally, the model created for general academic success allowed a correct estimation of 83.9% ( $\chi^2_{(7)} = 151.92, p = .00$ ). Nagelkerke's  $R^2$  was .56. The OR indicated that the probability of getting general academic success increased: (a) 12.41 times when the student was a non-daily smoker; (b) 1.15 times every time that the score on GS scale increased one point; (c) 6.65 times when the student had not been retained; (d) 2.98 times for female students; (e) .95 times every time that the score on V scale increased one point (f) .21 times for students in 9<sup>th</sup> grade compared to 10<sup>th</sup> grade, and; (g) .61 times every time that the score on FA scale increased one point (see Table 2).

## Discussion

The purpose of this study was twofold. Firstly, the relation between alcohol and tobacco use and academic performance was examined. Secondly, the predictive power of healthy behaviours (i.e. non-tobacco and non-alcohol abuse), cognitive-motivational variables (i.e. academic self-concept, academic goals, and academic self-attributions), grade level, non-grade retention, and sex on academic performance was analyzed in a sample of Spanish students of Compulsory Secondary Education.

Descriptive statistics for alcohol and tobacco use and academic performance showed that alcohol abuse was more prevalent than tobacco abuse. Furthermore, the proportion of daily-smoker girls was higher than such proportion of boys, and the proportion of alcohol and tobacco abuse increases gradually with academic year. This pattern of results is similar to the one found in ESTUDES 2010 survey (Observatorio Español de la Droga y la Toxicomanía, 2011) and to that pointed by other Spanish authors (Moral et al., 2005).

Results of the present study also revealed that between 14% and 16% of students achieved high performance (score of eight or above) in mathematics and Spanish language. These proportions are low but support the results of PISA (OECD, 2010). According to this report, a high rate of Spanish students got a very poor competence level in reading and maths. In any case, more girls than boys had higher general academic performance. These results are consistent and support, for example, that more women (69.9%) than men (59.1%) have completed post-compulsory education and carry on with their university studies (Ministerio de Educación y Ciencia, 2011).

Results also revealed that those adolescents who abuse of alcohol or smoke daily showed poor academic performance.

Thus, adolescents in non-healthy behaviours tend to obtain low grades maybe because their interest is not posited on school realm but in social area or because substance consumption interferes with their study tasks (Chassin et al., 2004).

Regarding the predictive power of healthy behaviours, results showed that non-frequent smokers were more likely than frequent smokers to attain high academic performance in Maths, while non-alcohol abusers were more likely to obtain general academic success. In fact, those healthy behaviours (i.e. non-alcohol abuse and non-daily smoking) appeared as the factors with the highest predictive power on Maths and general academic performance. Those results point out to the importance of promoting healthy behaviours in order to improve both adolescents' health and academic performance. In that sense, healthy programs focused on relevant variables for drugs abstinence (like empathy, future orientation or pressure resistance) should be addressed (Pérez de la Barrera, 2012). However, it is also noticeable that neither non-alcohol abuse nor non-daily smoking appeared as predictive factors of Spanish language success. Those data could be pointing out that the influence of healthy behaviours on academic achievement depends on the academic area analyzed. Future research should attend to this issue more in depth.

Grade level and gender also showed different relations with academic performance depending on the academic area. Thus, the predictive power of grade level and gender on academic achievement appeared only for Spanish language and general academic performance. In agreement with the tendency found in previous studies (Cox et al., 2007), older adolescents were more likely to obtain high scores in Spanish language and in general academic performance. This finding could be explained by the more adapted academic goals that students show as they advance in their educational level (Delgado, Inglés, García-Fernández, Castejón, & Valle, 2010). According to gender, girls and boys have different experiences in social, psychological and academic areas which could be influencing how they face school requirements. In the present study, girls were more likely to obtain high scores on Spanish language and general academic performance, maybe because academic culture is more study orientated for girls than for boys (Van Houtte, 2004). As Tinklin (2003) posits, it is possible that the difference among boys and girls in academic achievement does not depend on biological sex but other social variables (friends or attitudes toward school) that benefit females. Future research should take into account those considerations.

Finally, regarding the predictive power of educational and cognitive-motivational variables on academic performance, results showed that general academic self-concept was the only variable that exerts an influence in every measure of academic performance. Therefore, a positive image of oneself regarding academic area contributes positively on academic success. Academic self-attributions also appeared as a significant variable, in contrast with results found by Musgrave-Marquart et al. (1997). In our study a difference was stated between success and failure situations and verbal and math tasks, which allows a more specific analyse of attribution role. In this sense, results also showed that students who attributed success to ability increased their probability of attaining high grades; whereas

attribution of failure to ability decreased the probability of succeed. Differences were found according to academic areas. Not being retained also was an important predictive factor on academic performance but only on Spanish language and general academic performance. Those results point out to the need of applying solutions different from retention to improve academic performance of those students who do not achieve school expected requirements (Jimerson & Ferguson, 2007).

Findings must be interpreted within the context of study limitations, which should be solved in future research. Thus, it is important to bear in mind that self-report measures, specifically regarding drug consumption, may underestimate those behaviours (Inglés et al., 2007). The use of biological tests for assessing alcohol and tobacco use and the inclusion of different informants (peers and/or parents) would provide more reliable measures of those variables. Furthermore, the inherent restrictions of cross-sectional models makes hardly recommended to analyze the proposed model following a longitudinal design and also to include relations among those variables which have profusely shown to be associated (Cox et al., 2007; Martínez-Lorca & Alonso-Sanz, 2003). Finally, although the internal consistency coefficients of some scales in the present study were small (less than .70; Nunnally & Bernstein, 1994, for a review), Prieto and Muñiz (2000) state that the internal consistency of a questionnaire is appropriate if its median is between .70 and .80 (as it is for the questionnaires in the present study). However, it is possible that the small consistency coefficient of the scale VSEC (Cronbach's alpha = .62) is influencing on the predictive power of this variable on Spanish academic performance. In fact, the predictive role of VSEC was contrary to what could be expected, showing that this result should be treated with caution.

Despite these limitations, results support the predictive power of psychosocial factors on academic performance, providing a multi-dimensional perspective approach to the study of adolescence functioning. Specifically, the use of three distinctive measures of academic achievement confirmed the importance of analysing data using academic domains separately. Therefore, these results point out that different strategies should be followed to improve performance depending on the academic area.

The consideration of cognitive-motivational, educational and health variables as determinants of academic performance provides the opportunity of identifying a general personal pattern of functioning. Thus, adolescents with high academic performance tend to be females in upper grades, non-daily tobacco users, non-alcohol abusers, and who have never been retained. They also show a high perception of themselves as students and attribute their success and failure to ability. Those results show that non-abusing of alcohol and tobacco is an important factor for getting high academic achievement, regardless of the predictive role of educational and cognitive-motivational variables.

The identification of the predictive power of the aforementioned risk and protective factors on academic performance may help those professionals who work in an everyday contact with adolescents to plan more effective interventions. As far as professionals become conscious of those influences they could posit their attention on those factors that are influencing adolescents' well-being.

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## Conflict of interest

Authors state that there are no conflicts of interest that interfere on the content of the present document.

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