

Sensation seeking and habits of smoking, alcohol consumption and sports practice in Secondary School students

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Original article

SUMMARY

Objective

To analyze the relationship between sensation seeking and consumption of alcohol and/or tobacco, and sports practice in adolescents.

Methodology

In this study, there were 272 secondary school students (age=14.14±1.35 years): 130 boys and 142 girls; 93 first year students and 179 second year students. The Sensation Seeking Scale (EBS-J) of Pérez et al. (1987) was used as well as an adaptation of the Health Behavior in School-Aged Children (Currie, 1998), which analyzed lifestyle.

Results

76% of the boys and 75.4% of the girls are reported as alcohol drinkers ($p=0.906$); 36.2% of the boys and 42.3% of the girls smoke tobacco ($p=0.304$); and 92.3% of the boys and 57.7% of the girls ($p<0.001$) are athletes, a practice which is reduced with age ($p=0.009$). Age is a risk factor for tobacco and alcohol consumption; however, the gender is not indicative of this consumption. The search of excitement and disinhibition are moderately predictive factors of tobacco consumption, and also disinhibition in alcohol consumption. No dimension of the EBS-J scale showed a predictive capacity of sedentary lifestyle.

Conclusions

SS is a personality factor related to the early consumption of substances such as alcohol and tobacco and whose traits were revealed as good indicators of the propensity in adolescents to consume these substances.

Key words: Adolescents, sports, alcohol consumption, tobacco consumption, sensation seeking.

RESUMEN

Objetivo

Analizar la relación existente entre la búsqueda de sensaciones y el consumo de alcohol, tabaco y práctica deportiva en adolescentes.

Metodología

Los participantes de este estudio han sido 272 escolares de educación secundaria (edad= 14.14±1.35 años), 130 niños y 142 niñas, 93 alumnos del primer ciclo y 179 del segundo ciclo. Se empleó la Escala de Búsqueda de Sensaciones (EBS-J) de Pérez et al. (1987) y para el análisis de los hábitos de vida se utilizó una adaptación del Health Behaviour in School-Aged Children (Currie, 1998).

Resultados

El 76% de los niños y el 75.4% de las niñas se declaran bebedores de alcohol ($p=0.906$); el 36.2% de los niños y el 42.3% de las niñas fuman ($p=0.304$); y el 92.3% de los niños por el 57.7% de las niñas ($p<0.001$) son deportistas, práctica que se reduce con la edad ($p=0.009$). La edad es un factor de riesgo de tabaquismo y consumo de alcohol; por el contrario, el sexo no es un factor predictivo de estos consumos. La búsqueda de excitación y desinhibición son factores moderadamente predictivos del consumo de tabaco y la desinhibición igualmente en el consumo de alcohol. Ninguna dimensión de la EBS-J mostró capacidad predictiva de la conducta sedentaria.

Conclusiones

La BS es un factor de personalidad relacionado con el consumo temprano de sustancias como el alcohol y el tabaco, revelándose algunos de sus rasgos como factores predictivos del consumo de estas sustancias en adolescentes.

Palabras clave: Adolescentes, práctica deportiva, consumo de alcohol, consumo de tabaco, búsqueda de sensaciones.

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INTRODUCTION

Adolescence is a period of major changes in the emotional, social, mental and physical scope, which shapes adolescent personality, interests, behaviors and lifestyles. In adolescence, individuals tend to have more independence and continuous unsupervised adult time is increased, which can influence in the acquisition of risk behaviors. Adolescence is a crucial stage in the acquisition of lifestyles, as some behavioral tendencies acquired in childhood are consolidated and new ones from other social environments are incorporated.¹

Typical factors that have been investigated in adolescents about healthy lifestyles refer to the practice of sport and physical activity, and alcohol and tobacco consumption.²⁻⁵

Currently in Spain there is a significant prevalence of obesity and overweight in children and youngsters. The prevalence of obesity among children who do not practice any sport is usually higher compared to those who do have this habit.⁶ The AVENA⁷ study, in turn, highlights that 40.8% of Spanish adolescents report that they do not practice physical activity, and that boys are more active than women ($p < 0.001$).

Tobacco and alcohol consumption is very common among adolescents and has become a public health problem. In Spain, according to the Spanish Observatory on Drugs,⁸ in 2008, in secondary school students aged 14 to 18, 81.2% had drunk alcohol at some time in life; 44.6% had smoked tobacco; 35.2% cannabis; and 17.3% tranquilizers or sleeping pills. As for tobacco consumption, it has been reduced, especially in adolescent girls: in 2008 the percentage of girls who smoked daily fell to 16.4% compared to 24% who did it in 2004. Yet alcohol situation is different, as risk consumption has increased and the percentage of adolescents who reported binge drinking is 29%. The starting age for consumption of both alcohol and tobacco has remained stable between 2004 and 2008: in 13.7 years at the start of alcohol and 13.3 years for tobacco.⁸ In turn, the AVENA⁷ study indicates that 29.9% of adolescents consume tobacco regularly, with no differences by gender. A review carried out by Cándido et al. (2007)⁹ from 5 national and 52 international studies conducted during the last decade, concerning the identification of risk and protection factors associated with the tobacco and alcohol consumption in secondary school students, highlights that the use and abuse of legal drugs such as alcohol and tobacco are related to the reciprocal use of these substances and the use of illegal drugs, personal variables (ethnicity, gender, age, academic year, personality traits, beliefs, attitudes and expectations regarding the consumption and internalizing versus externalizing disorders), social and family environment (socioeconomic status, academic performance, use of legal and illegal drugs by their relatives, parenting styles,

quality in family relationships and studies and work simultaneity) and organization of the weekend recreational habits.

The practice of physical activity has been considered as an alternative to prevent unhealthy life habits. Nevertheless, this widespread belief that participation in sports activities limits the use of addictive substances such as alcohol is not too clear; there are many young athletes having consumption patterns of such substance in a similar or significantly greater amount than their sedentary peers. In some cases, regular physical activity is an element that is associated with a lower prevalence in alcohol consumption.¹⁰ In other cases, sports participation is associated with the highest alcohol consumption.¹¹ However, in relation with tobacco, Tercedor et al. (2007)⁷ point out that in both men and women, active adolescents report less use of tobacco ($p \leq 0.01$) than sedentary people and that the older a person is, there is a higher tobacco consumption and less physical activity in both men and women ($p < 0.001$). Therefore, there is a tendency that physically active subjects smoke less or even do not do it. 80.9% of active subjects reported that they do not smoke versus 71.4% of non-active active subjects. In a study conducted with adolescents aged between 15 to 18 years in the Valencian Community, Pastor et al. (2006)¹² concluded that sports competition exerts an indirect influence on health behavior, and that sports participation acts as a mediating variable in this relationship. Thus, in both genders, the greater the perception of sport competition, the greater the practice of sport and the lower tobacco and alcohol consumption.

Sensation seeking (SS) has been extensively studied in research on the propensity to take risks in a wide range of behaviors such as high-risk driving, behaviors contributing to unintentional injuries, consumption of alcohol, tobacco and illicit drugs, poor eating habits, physical inactivity, practicing high-risk sports, sexual behavior, crime or other antisocial behavior and other recreational habits.¹³⁻¹⁶ Zuckerman (1979)¹⁷ considers that sensation seeking is a need to experience varied and complex sensations and the willingness to take physical and social risks for the simple desire to enjoy such experiences. These features can be divided in four dimensions: search of excitement and adventure, search of experiences, disinhibition and susceptibility to boredom.¹⁸ Men experience more SS than women, which may be due to both biological and socialization factors. In terms of age, it seems that there is a negative relationship between age and SS.^{15,19} SS is associated with several biological variables, including neurotransmitters, enzymes and hormones,¹⁵ and individual variation may be heritable.²⁰

Therefore, the SS correlates with alcohol and tobacco consumption among young people.^{21,22} In adolescents, consumers of addictive substances such as tobacco, alcohol or marijuana score higher in SS than non consumers.²³ In

turn, the search of emotions and sensations has been notable in sports athletes who practice high-risk sports.²⁴ Oliva (2007)²⁵ points out that the prefrontal cortex, a fundamental structure in many cognitive processes, undergoes an important development from puberty, which does not end until the first years of early adulthood. Other changes affect the mesolimbic circuit, associated with motivation and reward-seeking, which will be influenced by hormonal changes associated with puberty. As a result, during adolescence certain imbalance occurs between the two brain circuits that can justify the increased impulsivity and risk behaviors during this stage.

Early identification of risk behaviors among adolescents, such as tobacco and alcohol consumption, and a sedentary lifestyle, is essential to reduce negative health consequences. The objective of this study is to analyze the relationship between sensation seeking and consumption of alcohol and tobacco, and sports practice in adolescents.

METHOD

Participants

Participants in this study are secondary school students from 1st to 4th of Compulsory Secondary Education (CSE) in the Province of Jaén (Spain). The total number of subjects was 272 students (age=14.14 ± 1.35 years), 130 boys (age=14.11 ± 1.55 years, Body Mass Index [BMI]=21.19 ± 3.70 kg/m²) and 142 girls (age=14.13 ± 1.61 years, BMI=21.32 ± 3.47 kg/m²), from which 93 students are from the first cycle of CSE and 179 from the second cycle.

Material

The Sensation Seeking Scale for Children and Adolescents (SSS-J) of Perez et al. (1987) has been used.²⁶ This scale measures trait SS in children and adolescents. It has 50 questions in a dichotomous response scale, and is divided into four dimensions: search for emotions (SfEM), search for excitement (SfEX), susceptibility to boredom (SBO), sincerity (S) and an overall assessment of the scale (Total of SSS-J scale). For the analysis of lifestyle an adaptation of Health Behavior in School-Aged Children²⁷ has been used, in which aspects of alcohol consumption (yes/no) and its frequency (never, rarely, every day, every week, every month), as well as binge drinking (never, once, 2-3 times, 4-10 times, more than 10 times). Tobacco consumption (yes/no) and its frequency (never, every day, several times a week but not every day, less than once a week), sports practice (yes/no) and its frequency (every day, 4-6 times a week, 2-3 times a week, once a week, once a month, less than once a month, never); establishing the cutoff point for considering the adolescent as an athlete practicing his/

her sport at least three times a week, taking into account the healthy sport thresholds identified by Haskell et al. (2007).²⁸ In addition, the hours of sports practice were recorded on a weekly basis. As anthropometric parameters, the following were analyzed: height (cm), measured with a stadiometer Seca 22 (Hamburg, Germany); body mass (kg) registered with a scale Seca 634 (Hamburg, Germany); and BMI, obtained from the equation BMI=weight (kg)/height (m²).

Procedure

An interview with the director of the school was held to outline the objectives of the research and to promote its collaboration. Subsequently an information letter was sent to parents to explain the objectives of the study and to request their written informed consent authorizing their children to participate in the study. The surveys were completed by students in their classrooms voluntarily, anonymously and in the presence of an investigator to address their concerns. Data collection was conducted between April and May 2012. The study was approved by the Bioethics Committee of the University of Jaén.

Statistical analysis

The data were analyzed using the SPSS statistical software, v.19.0 for Windows (SPSS Inc., Chicago, USA) and the significance level was set at $p < 0.05$. The data are shown in descriptive statistics of mean, standard deviation and percentage. Education cycle, gender, drinker *vs.* non-drinker, smoker *vs.* non-smoker and athlete *vs.* non-athlete were settled as explanatory factors. The chi-square test was used to analyze qualitative variables between groups. ANOVAs were performed between groups, ANCOVA with gender as a covariate when comparing age groups and ANCOVA with age as a covariate when comparing genders. Binary logistic regression with the SSS-J scale was performed, age and gender as predictors of smoking habits, alcohol consumption and sedentary behavior. The predictive efficiency of the above variables in every habit of life has been established by ROC (Receiver Operating Characteristic) curves. A K-means *cluster* analysis was conducted with the SSS-J scale. Finally, Pearson and Spearman correlations were performed between the SSS-J scale and the frequency of consumption of tobacco, alcohol and hours of sport practice.

RESULTS

Regarding sports practice there are significant differences ($p < 0.001$) between genders, with an emphasis that 92.3% of boys are athletes *vs.* 57.7% of girls. As for alcohol con-

Table 1. Consumption of alcohol and tobacco in athletes and non-athletes

	Athletes n (%)	Non-Athletes n (%)	p-value
Alcohol drinker			
• No	56 (27.7)	11 (15.7)	0.044
• Sí	146 (72.3)	59 (84.3)	
Smoker			
• No	132 (65.3)	33 (47.1)	0.007
• Sí	70 (34.7)	37 (52.9)	

sumption, 76% of boys and 75.4% of girls admit that they drink alcohol ($p=0.906$). As for tobacco consumption, 36.2% of boys and 42.3% of girls smoke ($p=0.304$). By education cycles, 83.9% of boys of the first cycle of CSE *vs.* 69.3% of the second cycle admit they are athletes ($p=0.009$). In alcohol consumption, 45.7% of the first cycle of CSE *vs.* 91.1% of the second cycle admit they drink alcohol ($p<0.001$). Finally, in relation to smoking, 15.1% of the first cycle of CSE *vs.* 52% of the second cycle admit they smoke ($p<0.001$). The frequency of alcohol consumption, 3.2% *vs.* 14.5% ($p<0.001$) of boys of the first cycle and second cycle of the CSE, respectively, consume alcohol on a weekly basis. In relation to gender, there are no significant differences

($p=0.413$), thus, 11.5% of boys and 9.9% of girls admit they drink alcohol every week. In smokers and in relation to gender there are no significant differences in the number of cigarettes consumed per week ($p=0.429$); boys consume 6.88 ± 22.76 cigarettes *vs.* 9.26 ± 26.51 cigarettes by girls. By education cycles we did find significant differences ($p<0.001$): boys of the first cycle consume 1.72 ± 10.97 cigarettes per week *vs.* 11.45 ± 28.98 cigarettes in the second cycle. In the frequency of binge drinking, we found no significant difference ($p=0.780$) between genders: 65.4% of boys *vs.* 59.9% of girls have never been drunk. By education cycles there are significant differences ($p<0.001$): 86% *vs.* 50.3% of boys of first and second cycle of CSE, respectively, have never been drunk.

Table 1 shows the contingencies that relate the habit of sports practice with the habit of smoking and drinking. It can be seen that the percentage of alcohol drinkers and smokers is higher in the group of non-athletes.

Table 2 shows the results of the SSS-J scale in relation to the different explanatory factors. Adolescents of the second cycle of CSE have significantly higher scores ($p<0.01$) on dimensions SfEM, SfEX, lack of inhibition (DIS), total SSS-J scale and S. Boys have significantly higher scores on SfEM ($p<0.001$), S ($p=0.032$) and on the total SSS-J scale ($p=0.027$) than girls and close to statistical significance on DIS ($p=0.052$) and girls a higher score on SBO ($p=0.050$). Alcohol consumers have higher scores on SfEX ($p=0.001$), DIS ($p<0.001$) on

Table 2. EBS-J Scale in relation to different explanatory factors (educational cycle, gender, drinker *vs.* non-drinker, smoker *vs.* non-smoker and athletes *vs.* non-athletes)

	BEM Average (SD)	BEX Average (SD)	DES Average (SD)	SAB Average (SD)	EBS-J Average (SD)	S Average (SD)
First cycle of ESO	4.70 (3.04)	3.39 (1.72)	2.38 (1.99)	4.00 (2.47)	14.46 (5.97)	6.18 (2.46)
Second cycle of ESO	5.66 (3.09)	4.45 (1.82)	4.35 (2.32)	4.10 (2.34)	18.56 (5.82)	7.12 (2.26)
p-value	0.005	<0.001	<0.001	0.824	<0.001	0.001
Boy	6.26 (2.78)	3.99 (1.77)	3.95 (2.35)	3.77 (2.22)	17.96 (5.79)	7.12 (2.16)
Girl	4.48 (3.14)	4.18 (1.93)	3.43 (2.42)	4.34 (2.50)	16.42 (6.44)	6.51 (2.52)
p-value	<0.001	0.556	0.052	0.050	0.027	0.032
Alcohol drinker	5.54 (3.08)	4.31 (1.82)	4.23 (2.33)	4.19 (2.34)	18.25 (5.95)	7.18 (2.15)
Non-drinker	4.70 (3.09)	3.42 (1.80)	1.99 (1.75)	3.70 (2.48)	13.80 (5.67)	5.64 (2.63)
p-value	0.056	0.001	<0.001	0.150	<0.001	<0.001
Smoker	5.72 (2.94)	4.81 (1.83)	4.92 (2.43)	4.47 (2.34)	19.91 (5.71)	7.49 (2.15)
Non-smoker	5.08 (3.18)	3.62 (1.72)	2.87 (2.01)	3.81 (2.37)	15.37 (5.82)	6.35 (2.40)
p-value	0.096	<0.001	<0.001	0.025	<0.001	<0.001
Athlete	5.54 (3.09)	3.89 (1.81)	3.49 (2.31)	3.93 (2.34)	16.85 (6.21)	6.71 (2.42)
Non-athlete	4.71 (3.05)	4.67 (1.87)	4.21 (2.57)	4.46 (2.47)	18.05 (6.04)	7.06 (2.22)
p-value	0.053	0.002	0.030	0.112	0.160	0.289

SD = Standard deviation. SfEM = Search for Emotions. SfEX = Search for Excitement. DIS = Disinhibition. SBO = Susceptibility to Boredom. SSS-J = Overall assessment of the scale (Total SSS-J). S = Sincerity. CSE = Compulsory Secondary Education.

the total SSS-J scale ($p<0.001$) and on S ($p<0.001$) and close to statistical significance on SfEM ($p=0.056$). Smokers show higher scores than non-smokers on SfEX ($p<0.001$), DIS ($p<0.001$), SBO ($P=0.025$), on the total SSS-J scale ($p<0.001$) and on S ($p<0.001$). Finally, non-athletes score higher than athletes on SfEX ($p=0.002$) and DIS ($p=0.030$) and athletes higher values close to statistical significance on SfEM ($p=0.053$).

From the cluster analysis, we present three distinct clusters of high-to-low score on the SSS-J scale. In cluster 1, 70 subjects (25.74%) are assigned, being the group with the highest score on the SSS-J scale (24.8; cluster 2, with an intermediate score (17.7) and 120 subjects (44.11%); and cluster 3, with 82 subjects (30.15%) and the lowest score on the SSS-J scale (9.76).

In Table 3 the results are shown in the consumption of alcohol, of tobacco and sports practice in different clusters. There is an increased presence of smokers and alcohol drinkers as the conglomerate has a higher value in the SSS-J scale; however, we found a similar percentage of athletes in the three clusters.

Age significantly correlates with SfEM ($r=0.152$, $p=0.012$), SfEX ($r=0.315$, $p<0.001$), DIS ($r=0.367$, $p<0.001$), S ($r=0.127$, $p=0.037$) and the total SSS-J scale ($r=0.327$, $p<0.001$). The number of cigarettes smoked per week significantly correlates with SfEX ($r=0.224$, $p<0.001$), DIS ($r=0.319$, $p<0.001$), S ($r=0.122$, $p=0.044$) and the total SSS-J scale ($r=0.199$, $p=0.001$). The frequency of drinking significantly correlates with SfEX ($r=0.264$, $p<0.001$), DIS ($r=0.495$, $p<0.001$), S ($r=0.312$, $p<0.001$) and the total SSS-J scale ($r=0.337$, $p<0.001$).

The logistic regression analysis shows that, for the habit of not being an athlete, female sex (*odds ratio*=10.466, I.C. 95%=4919-22.268, $p<0.001$) and DIS (*odds ratio*=1.221, I.C. 95%=1.074-1.387, $p=0.002$) are risk factors. For smoking, SfEX (*odds ratio*=1.204, I.C. 95%=1.019-1.422, $p=0.030$), DIS (*odds ratio*=1.318, I.C. 95%=1.148-1.513, $p<0.001$) and the group of the second cycle of CSE (*odds ratio*=3.552, I.C. 95%=1.781-7.083, $p<0.001$) are risk factors. Finally, in the

Table 3. Consumption of alcohol, tobacco and sports practice in different clusters

	High SS n (%)	Average SS n (%)	Low SS n (%)	p-value
Drinker	63 (90.0)	93 (77.5)	49 (59.8)	<0.001
Non-drinker	7 (10.0)	27 (22.5)	33 (40.2)	
Smoker	42 (60.0)	46 (38.3)	19 (23.2)	<0.001
Non-smoker	28 (40.0)	74 (61.7)	63 (76.8)	
Athlete	50 (71.4)	89 (74.2)	63 (76.8)	0.738
Non-athlete	20 (28.6)	31 (25.8)	19 (23.2)	

SS: Sensation seeking.

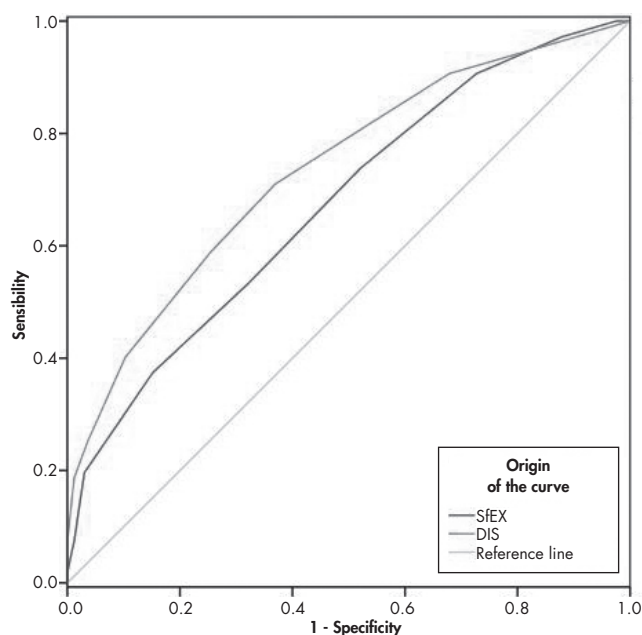


Figure 1. Smoking predicted by DIS (disinhibition) and SfEX (search for excitement) ROC curve.

habit of drinking, DIS (*odds ratio*=1.466, I.C. 95%=1.227-1.752, $p<0.001$) and the group of the second cycle of (*odds ratio*=7.854, I.C. 95%=3.935-15.676, $p<0.001$) are risk factors.

The habit of not being an athlete predicted by DIS has a low power of discrimination (area under the curve [AUC]=0.573, IC 95%=0.495-0.651, $p=0.070$). Figure 1 shows the ROC curve of the smoking habit predicted by DIS (AUC=0.735, IC 95%=0.674-0.796, $p<0.001$) and SfEX (AUC=0.673, IC 95%=0.608-0.738, $p<0.001$), thus the cutoff point for DIS is 4.50 (sensitivity=0.589, 1-specificity=0.255) and for SfEX is 4.50 (sensitivity=0.533, 1-specificity=0.321), which makes it an acceptable discrimination power for both variables. Finally, and regarding the habit of drinking, Figure 2 shows the ROC curve in which DIS (AUC=0.776, IC 95%=0.715-0.837, $p<0.001$) provides a high discrimination power, thus the cutoff point is 2.50 (sensitivity=0.761, 1-specificity=0.328).

DISCUSSION

The SS in its dimensions SfEX and DIS is a moderately predictive factor of the consumption of tobacco and DIS also in the consumption of alcohol. No dimension of the SSS-J scale showed a predictive capacity of sedentary lifestyle in adolescents. In this study, 76% of boys and 75.4% of girls admit that they drink alcohol ($p=0.906$). As for tobacco consumption, 36.2% of boys and 42.3% of girls smoke ($p=0.304$). There are similar data to the study of Cándido et al. (2007),⁹

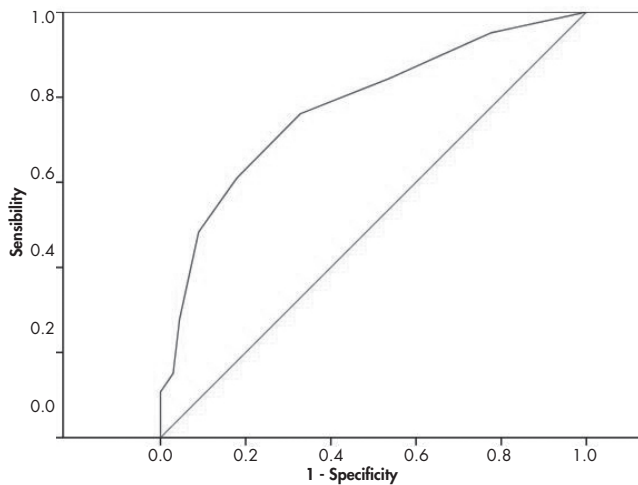


Figure 2. Alcohol drinking habit predicted by DIS (disinhibition) ROC curve.

indicating that 82.20% of children have ever consumed alcohol and 40.40% tobacco. These results corroborate the findings of the Spanish Observatory on Drugs⁸ indicating that 81.2% of children had consumed alcohol at least once in life and 44.6% tobacco. They are also similar to the data of the European School Survey Project on Alcohol and Drugs,²⁹ indicating that at 15 years old 30% of European students smoked at least one cigarette.

Consistent with other studies,³⁰ this research shows the existence of a large number of adolescent consumers of alcohol and tobacco, which evidence a high prevalence of use of these addictive substances. Age is a risk factor for smoking and alcohol consumption. Thus, adolescents of the second cycle of CSE have higher consumption; on the contrary, gender was not a predictive factor of consumption. However, in Spain, being a woman is a risk factor in the frequent consumption of alcohol.³⁰ Regarding tobacco consumption, there is a higher probability of use among female students. As age increases, the likelihood of using alcohol and tobacco grows more frequently.³⁰

The propensity to use substances such as alcohol, tobacco and marijuana is associated with SS.³¹ In this study, adolescents who smoke and drink alcohol have a higher score on the total SSS-J scale. In this sense, SS is higher in men and women who consume nicotine and alcohol.³¹ Saiz et al. (1999)³² also highlight a higher score on the scale of SS among youth (both male and female) consuming illegal substances. On the other hand, Sargent et al. (2010)³³ show that the SS is a predictor of heavy drinking both in male (AUC=0.72, IC 95%=0.69-0.74) and female adolescents (AUC=0.70, IC 95%=0.68-0.73) and of consumption of tobacco in male (AUC=0.78, IC 95%=0.74-0.83) and female adolescents (AUC=0.81, IC 95%=0.75-0.86). In addition, in this study in line with other authors,^{34,35} the SS was posi-

tively associated with pubertal development in males and females.

92.3% of boys vs. 57.7% of girls ($p<0.001$) are athletes, a practice that reduces with age. Thus, 83.9% of boys of the first cycle of CSE compared to 69.3% of the second cycle admit they are athletes ($p=0.009$). These results are superior to those of Román et al. (2006),³⁶ indicating that 39% of boys and 21% of girls aged between 2 and 24 years practice physical activity two or more days a week. These figures are higher than those found in the National Health Survey (2006),³⁷ in which, for the age group of 16 to 24 years, there is a prevalence of physical activity of 71.8% in men and 55.5% in women. In this study, being a woman is a risk factor for sedentary lifestyle. Other authors³⁸ also reflect that (male) gender and age (the older a person is the less his/her sports practice) are variables that are associated consistently with the physical activity of adolescents, as well as with other variables such as perceived competence, previous physical activity, sports of the community, the SS, the parental support, the support from others, sibling physical activity and exercise opportunities. With age there is an increased physical activity until 10-13 years; thereafter the practice decreases. Socioeconomic status and educational level of the mother positively influence the degree of physical activity of the population.³⁶ The relationship between the consumption of alcohol or tobacco and behaviors before the physical-sport practice indicate that physically active adolescents smoke and drink less than inactive adolescents; which results are consistent with Ruiz-Risueño et al. (2012).³⁰

The relationship between SS, pubertal development and lifestyle, including the consumption of alcohol and tobacco in adolescents, can help to understand the changes in drug use observed in this age. The effectiveness of using the alternative excitation, for example by practicing certain sports, has not been determined yet and would be a fruitful research line. It bears mentioning that the predictive validity of the risk factors in the consumption of alcohol, tobacco and sedentary behavior must be analyzed in longitudinal samples prior to use it as a variable of orientation, in order to assess the overall predictive validity and determine the corresponding cutoff value. These results highlight the importance of properly addressing and assessing changes in traits related to early adolescence as starting unique predictors and the progression of substance use and lifestyle. The results of the study also have potential clinical implications, specifically in establishing the additional basis for the development of interventions for SS, and risk appetite as a means of reducing substance use.

Limitations

This study is a first step in understanding the change in the SS regarding the consumption of alcohol, tobacco and

the habit of sports practice in early adolescence; although a limited number of covariates have been examined. Future research would benefit from the analysis of other theoretically important characteristics (for example: expectations with regard to substance use, parental monitoring, parental styles, negative vital events, the influence of the social environment and friends).

CONCLUSIONS

SS is a personality factor related to the early consumption of substances such as alcohol and tobacco, and some of its traits are revealed as good indicators of the propensity to consume these substances. However, SS is not associated with the habit of sport practice in adolescents. Athletes consume less alcohol and tobacco.

REFERENCES

- Rodrigo MA, Máiquez ML, García M, Mendoza R et al. Relaciones padres-hijos y estilos de vida en la adolescencia. *Psicothema* 2004;16(2):203-210.
- Mantilla SC, Gómez A, Hidalgo MD. Physical activity and tobacco and alcohol use in a group of university students. *Rev Salud Pública (Bogotá)* 2011;17(5):748-758.
- Moreno JA, Moreno R, Cervelló, E. Relación de autoconcepto físico con las conductas de consumo de alcohol y tabaco en adolescentes. *Adicciones* 2009;21(1):147-154.
- Ruiz-Risueno J, Ruiz-Juan F, Zamarripa JI. Alcohol and tobacco consumption in Spanish and Mexican adolescents and its relation to physical and sports-related activity and to the family. *Rev Panam Salu d Publ* 2012;31(3):211-220.
- Terry-McElrath YM, O'Malley PM, Johnston LD. Exercise and substance use among American youth, 1991-2009. *Am J Prev Med* 2011; 40(5):530-540.
- Aranceta J, Serra L, Foz M, Moreno B, Grupo Colaborativo SEEDO. Prevalence of obesity in Spain. *Medi Clin-Barcelona* 2005;125(12):460-466.
- Tercedor P, Martín-Matillas P, Chillón LJ, Pérez FB et al. Incremento del consumo de tabaco y disminución del nivel de práctica de actividad física en adolescentes españoles. *Nutr Hosp* 2007;22(1):89-94.
- Ministerio de Sanidad y Política Social. Evaluación final de la estrategia nacional sobre drogas 2000-2008. Madrid: Delegación del Gobierno para el Plan Nacional sobre Drogas; 2010.
- Cándido J, Delgado B, Bautista R, Torregrosa M et al. Factores psicosociales relacionados con el consumo de alcohol y tabaco en adolescentes españoles. *Int J Clin Hlth Psych* 2007;7(2):403-420.
- Ruiz F, Ruiz J. Variables predictoras de consumo de alcohol entre adolescentes españoles. *An Psicol-Spain* 2011;27(2):350-359.
- Lorente FO, Souville M, Griffet J, Grélot L. Participation in sports and alcohol consumption among french adolescents. *Addict Behav* 2004;29(5):941-946.
- Pastor Y, Balaguer I, García-Merita M. Relaciones entre el autoconcepto y el estilo de vida saludable en la adolescencia media: un modelo exploratorio. *Psicothema* 2006;18(1):18-24.
- Bovard RS. Risk behaviors in high school and college sport. *Curr Sport Med Rep* 2008;7(6):359-366.
- Dunlop SM, Romer D. Adolescent and young adult crash risk: sensation seeking, substance use propensity and substance use behaviors. *J Adolescent Health* 2010;46(1):90-92.
- Roberti JW, Storch EA, Bravata E. Sensation seeking, exposure to psychosocial stressors, and body modifications. *Pers Indiv Differ* 2004;37(6):1167-1177.
- Zuckerman M. Sensation seeking and risky behaviour. Washington, DC: American Psychological Association; 2007.
- Zuckerman M. Sensation seeking: Beyond the optimal level of arousal. Hillsdale, NJ: Erlbaum; 1979.
- Zuckerman M, Eysenck S, Eysenck HJ. Sensation seeking in England and America: Crosscultural, age, and sex comparisons. *J Consult Clin Psych* 1978;46(1):139-149.
- Chico L. Búsqueda de sensaciones. *Psicothema* 2000;12(2):229-235.
- Stoel RD, De Geus EJ, Boomsma DI. Genetic analysis of sensation seeking with an extended twin design. *Behav Genet* 2006;36(2):229-237.
- Gullo MJ, Dawe S. Impulsivity and adolescent substance use: Rashly dismissed as "all-bad"? *Neurosci Biobehav R* 2008;32(8):1507-1518.
- Urban R. Smoking outcome expectancies mediate the association between sensation seeking, peer smoking, and smoking among young adolescents. *Nicotine Tob Res* 2010;12(1):59-68.
- Crawford A, Pentz M, Chou C, Li C et al. Parallel developmental trajectories of sensation seeking and regular substance use in adolescents. *Psychol Addict Behav* 2003;17(3):179-192.
- Guszkowska M, Boldak A. Sensation seeking in males involved in recreational high risk sports. *Biol Sport* 2010;27(3):157-162.
- Oliva A. Desarrollo cerebral y asunción de riesgos durante la adolescencia. *Apuntes Psicología* 2007;25(3):239-254.
- Pérez J, Ortet G, Plá S, Simó S. Escala de búsqueda de sensaciones para niños y adolescentes (EBS-J). *Evaluación Psicológica* 1987;3(2):283-290.
- Currie C. Health behaviour in school-aged children. Research protocol for the 1997-98 survey. A World Health Organization Cross-National Study. Edinburgh: University of Edinburgh; 1998.
- Haskell WL, Lee IM, Pate RR, Powell KE et al. Physical activity and public health: updated recommendation for adults from the American College of Sports Medicine and the American Heart Association. *Med Sci Sports Exerc* 2007;39(8):1423-1434.
- Hibell B, Anderson B, Ahlstrom S, Balakireva O et al. Alcohol and other drug use among students in 30 european countries. *Alcohol Alcoholism* 2003;38(1):99.
- Ruiz J, Ruiz F, Zamarripa JI. Alcohol and tobacco consumption in Spanish and Mexican adolescents and its relation to physical and sports-related activity and to the family. *Rev Panam Salu d Publ* 2012;31(3):211-220.
- Martin CA, Kelly TH, Rayens MK, Brogli BR et al. Sensation seeking, puberty, and nicotine, alcohol, and marijuana use in adolescence. *J Am Acad Child Adolesc Psychiatry* 2002;41(12):1495-1502.
- Saiz PA, González MP, Jiménez L, Delgado Y et al. Consumo de alcohol, tabaco y otras drogas y rasgos de personalidad en jóvenes de enseñanza secundaria. *Adicciones* 1999;11(3):209-220.
- Sargent JD, Tanski S, Stoolmiller M, Hanewinkel R. Using sensation seeking to target adolescents for substance use interventions. *Addiction* 2010;105(3):506-514.
- Kelly AB, Chan G, Toumbourou JW, O'Flaherty M et al. Very young adolescents and alcohol: Evidence of a unique susceptibility to peer alcohol use. *Addictive Behaviors* doi:10.1016/j.addbeh.2011.11.038.
- MacPherson L, Magidson JF, Reynolds EK, Kahler CW et al. Changes in sensation seeking and risk-taking propensity predict increa-

- ses in alcohol use among early adolescents. *Alcohol Clin Exp Res* 2010;34(8):1400-1408.
36. Román B, Serra L, Ribas L, Pérez-Rodrigo C et al. Actividad física en la población infantil y juvenil española en el tiempo libre. *Apunts Med L'esport*. 2006;41(151):86-94.
37. Ministerio de Sanidad y Consumo. Encuesta Nacional de Salud 2006. Available at: <http://www.msps.es/estadEstudios/estadisticas/encuesta-Nacional/encuestaNac2006/encuestaNacionalSalud2006.pdf>.
38. Sallis JF, Prochaska JJ, Taylor WC. A review of correlates of physical activity of children and adolescents. *Med Sci Sport Exer* 2000;32(5):963-975.

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