

Factors Associated With Risky Consumption and Heavy Episodic Drinking Among Spanish University Students*

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ABSTRACT. Objective: The purpose of this study was to determine the prevalence of risky consumption (RC) and heavy episodic drinking (HED) in Spanish university students and their associated factors. **Method:** We conducted a cross-sectional analysis (target $N = 2,700$) within the framework of a cohort study designed to evaluate the neuropsychological and psychophysiological consequences of alcohol consumption. Alcohol consumption was measured with the Alcohol Use Disorders Identification Test (AUDIT). The following independent variables were also collected by questionnaire: gender, place of residence, parents' education, alcohol consumption in the family, age at onset of use, and alcohol expectancies. We constructed logistic regression models using two dichotomous variables: (1) RC, dichotomizing the AUDIT score and (2) HED, dichotomizing the AUDIT question about consumption of six or more drinks on a single occasion. **Results:** The

response rate on enrolled students was 50.7% (99% on students present in class the day of the survey). The prevalence of RC was 37.1%, the prevalence of HED was 12.2%, and the prevalence of abstainers was 12.6%. In relation to RC, the multivariate model showed that high expectancies (odds ratio [OR] = 4.77), early age at onset of use (OR = 4.75), and high maternal educational level (OR = 1.56) constituted risk factors. In contrast, living with parents constituted a protective factor (OR = 0.39). For HED, early age at onset of use (OR = 7.16), high expectancies (OR = 2.89), and being male (OR = 3.41) were risk factors. **Conclusions:** Results suggest that, to decrease consumption among adolescents in Spain, strategies should focus on modifying expectancies, limiting access to alcohol at young ages, and targeting students of higher socioeconomic status and those living away from home. (*J. Stud. Alcohol Drugs* 69: 308-312, 2008)

HEAVY EPISODIC DRINKING (HED) is an emergent pattern of alcohol use among Spanish students characterized by the consumption of high quantities of alcohol in a short span of time. HED is different from risky consumption (RC), which is characterized by a high consumption of alcohol but not necessarily in a short span of time. The prevalence of HED among youth varies significantly (7%-40%) in different countries (Hibell et al., 2004; Newes-Adeyi et al., 2005; White et al., 2006; World Health Organization, 2004). Part of this variability could be attributed to different cutoff values (four, five, or six drinks) and to the fact that HED is measured as a period prevalence (last week, 15 days, etc.).

In Europe, the prevalence of HED (five or more drinks once or at least three times in the last 30 days) among students varies significantly between countries. Denmark, Ireland, Holland, Norway, Poland, Sweden, and the United Kingdom exhibit the highest prevalences (24%-32%), whereas France, Greece, Hungary, and Rumania exhibit lower values (5%-11%) (Hibell et al., 2004). D'Alesio et

al. (2006) found a prevalence of 32.9% among Italian university students. In Spain, a recent study showed that about 22% of youth in the 18- to 30-year age range report having six or more drinks at least once a week (Xunta de Galicia, 2005).

Because the brain of an adolescent is still developing, it is more vulnerable to the neurotoxic effects of alcohol. Consequences resulting from this pattern of use are still not completely known, although recent studies suggest that the effects in adolescents differ from those in adults. Studies also highlight the existence of mid- to long-term neuropsychological consequences (Goudriann et al., 2007; Tapert and Schweinsburg, 2005).

Prevention of alcohol use in youth is closely linked to the detailed knowledge of the risk factors associated with this pattern. It is well known that the characteristics of the adolescent's family background are related to alcohol use (Crabbe, 2002; Kendler, 2001; Merikangas et al., 1998). It has also been shown that the age at onset of use could be associated with the level of consumption. Expectancies about the effects of alcohol use are also one of the variables associated with its consumption. The relevance of the study of expectancies stems from the fact that they are susceptible to modification (D'Amico and Fromme, 2002; Dunn and Yniguez, 1999; Dunn et al., 2000).

The goal of this study was to determine the prevalence of RC and HED among Spanish university students, as well as their associated factors.

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Method

Design, population, and sample

A cross-sectional analysis was conducted within the framework of a cohort study designed to evaluate the neuropsychological and psychophysiological consequences of alcohol use. The study population was composed of first-year students (18-19 years old) at the University of Santiago de Compostela (target $N = 2,700$). Initial data collection was performed by means of a questionnaire completed by students in the classroom (October-February 2006).

Data collection procedures

Alcohol use was measured with the Galician validated version of the Alcohol Use Disorders Identification Test (AUDIT) (Saunders et al., 1993; Varela et al., 2005). In this version, for a screening of RC, the cutoff value is 5 for men and 4 for women. Along with the AUDIT, we used another questionnaire that asked about the potential factors associated with alcohol use (educational level and alcohol use of parents, presence of alcohol-related problems, and age at onset of use). One of the items in this second ques-

tionnaire referred specifically to alcohol expectancies. Students were required to rank seven positive and seven negative expectancies about the effects of alcohol. This specific question was generated by using items from a questionnaire previously used with Spanish youth (Defensor del Menor, 2003).

Definition of variables

Independent variables. Several sociodemographic variables were considered, such as gender, place of residence (at the parents' home/outside of the parents' home), and the maternal educational level (primary school/high school/university). Alcohol use in the subject's family was included as mother's alcohol use (does not consume/consumes). Four categories were defined for age at onset of use: (1) after age 16, (2) at age 16, (3) at age 15, and (4) before age 15. Finally, taking the number of positive and negative expectancies into account, a score ranging from 0 to 14 was generated (with 0 being the maximum number of negative expectancies and 14 being the maximum number of positive expectancies). The scores were divided into quartiles.

Dependent variables. Three variables were considered: (1) AUDIT score—a continuous variable with values

TABLE 1. Main characteristics of the subjects and alcohol consumption

Variable	n^a (%)	AUDIT score ^b						Prevalence, % (95% CI)		
		Mean	P10	P25	P50	P90		Risky consumption	Heavy episodic drinking	Abstemious
Gender										
Female	992 (72.5)	4.13	0	2	4	8		37.8 (34.7-40.9)	8.2 (6.4-9.9)	13.3 (11.1-15.5)
Male	371 (27.1)	5.41	1	3	4	12		35.8 (30.8-40.8)	22.9 (18.5-27.3)	10.5 (7.6-13.8)
No response	6 (0.4)									
Residence										
Outside the parents' home	1,005 (73.4)	4.73	1	2	4	9		41.3 (38.2-44.4)	12.5 (10.4-14.6)	12.0 (10.0-14.0)
At the parents' home	354 (25.9)	3.85	0	2	3	7		26.3 (21.5-31.0)	11.0 (7.6-14.4)	13.8 (10.1-17.6)
No response	10 (0.7)									
Maternal educational level										
Primary school	528 (38.6)	4.02	0	2	3	8		31.4 (27.4-35.5)	10.6 (7.9-13.3)	15.2 (12.0-18.3)
High school	430 (31.4)	4.49	1	2	4	9		40.0 (35.3-44.7)	11.6 (8.5-14.8)	10.9 (7.9-14.0)
University	389 (28.4)	5.14	1	3	4	11		42.9 (37.9-48.0)	15.2 (11.5-18.9)	10.8 (7.6-14.0)
No response	22 (1.6)									
Mother's alcohol use										
Abstemious	852 (62.2)	4.47	0	2	4	9		38.3 (34.8-41.5)	11.6 (9.4-13.8)	12.7 (10.4-15.0)
No abstemious	499 (36.4)	4.53	0	2	4	9		35.3 (31.0-39.6)	13.2 (10.1-16.3)	12.4 (9.4-15.3)
No response	18 (1.3)									
Age at onset of use										
After 16 years old	223 (16.3)	3.58	2	2	3	6		19.8 (14.3-25.2)	4.9 (1.9-8.0)	5.8 (2.5-9.1)
At 16	455 (33.2)	4.84	2	3	4	9		39.7 (35.2-44.4)	5.7 (3.5-8.0)	2.2 (0.7-3.7)
At 15	290 (21.2)	5.45	2	3	5	9		51.7 (45.8-57.7)	18.6 (14.0-23.3)	1.7 (0.6-4.0)
Before the age of 15	219 (16.0)	6.45	2	4	5	12		58.0 (51.2-64.8)	32.9 (26.4-39.3)	1.8 (0.5-4.6)
No response	189 (13.3)									
Positive expectancies										
Low	235 (17.2)	2.65	0	1	2	6		14.2 (9.4-18.7)	4.7 (1.8-7.6)	28.5 (22.5-34.5)
Medium	363 (26.5)	4.55	1	2	4	9		34.8 (29.7-39.8)	9.9 (6.7-13.1)	9.1 (6.0-12.2)
High	541 (39.5)	5.28	2	3	5	10		48.7 (44.3-53.0)	16.1 (12.9-19.3)	6.5 (4.3-8.6)
No response	230 (16.8)									
Total subjects	1,369	4.49	0	2	4	9		37.1 (34.5-39.7)	12.2 (10.4-14.0)	12.6 (10.8-14.4)

Notes: AUDIT = Alcohol Use Disorders Identification Test; CI = confidence interval. ^aNumber of subjects and proportions in the sample; ^bmean and percentiles 10, 25, 50, and 90.

TABLE 2. Influence of characteristics of subject and his/her family background on risky consumption and heavy episodic drinking

Variable	Risky consumption		Heavy episodic drinking	
	Univariate OR (95% CI)	Multivariate ^a OR (95% CI)	Univariate OR (95% CI)	Multivariate ^a OR (95% CI)
Gender				
Female	1	1	1	1
Male	0.92 (0.72-1.18)	1.39 (1.00-1.92)	3.43 (2.40-4.65)	3.41 (2.27-5.12)
Residence				
Outside the parents' home	1	1	1	1
At the parents' home	0.51 (0.39-0.67)	0.39 (0.28-0.54)	0.86 (0.59-1.27)	
Maternal educational level				
Primary school	1	1	1	1
High school	1.45 (1.11-1.89)	1.33 (0.95-1.85)	1.11 (0.74-1.66)	
University	1.64 (1.25-2.15)	1.56 (1.10-2.21)	1.51 (1.02-2.23)	
Mother's alcohol use				
Abstemious	1	1	1	1
No abstemious	0.89 (0.71-1.12)	2.03 (0.57-7.25)	1.15 (0.83-1.60)	
Age at onset of use				
After 16 years old	1	1	1	1
At 16	2.67 (1.82-3.90)	2.20 (1.42-3.42)	1.17 (0.57-2.41)	0.93 (0.42-2.04)
At 15	4.33 (2.90-6.48)	4.02 (2.52-6.40)	4.41 (2.25-8.66)	3.45 (1.65-7.23)
Before the age of 15	5.60 (3.66-8.58)	4.75 (2.90-7.77)	9.44 (4.84-18.4)	7.16 (3.46-14.8)
Positive expectancies				
Low	1	1	1	1
Medium	3.24 (2.11-4.96)	2.77 (1.73-4.46)	2.24 (1.12-4.50)	1.69 (0.79-3.61)
High	5.75 (3.84-8.63)	4.77 (3.03-7.48)	3.90 (2.04-7.45)	2.89 (1.43-5.85)

Notes: OR = odds ratio; CI = confidence interval. ^aAdjusted for the other independent variables included in the column.

ranging from 0 to 40; (2) RC—a dichotomous variable generated from the AUDIT score and a different cutoff value established according to gender: <4 for women and <5 for men; and (3) HED—a dichotomous variable generated from the third AUDIT question (“How often do you have 6 or more alcoholic drinks per occasion?”), which was coded as follows: never = 0, less than once a month = 0, once a month = 0, once a week = 1, and daily or almost daily = 1. The sensitivity and specificity of this question with this cutoff value are, respectively, .40 and .94. The area under the curve is .767 (95% confidence interval [CI]: .718-.816) (Tuunanen et al., 2007).

Statistical analysis

Logistic regression was used to estimate odds ratios (ORs). All subjects, even abstainers, were included in the models. Maximal models were generated, including all theoretical independent variables. From these maximal models, final models were generated. Final models included all significant variables and also no significant variables when their exclusion changed the OR of other variables by more than 10%.

Results

The response rate on enrolled students was 50.7% (99% on students present in class the day of the survey). Table 1 shows the characteristics of students and the prevalence of alcohol use. The prevalence of RC was 37.1%, the prevalence

of HED was 12.2%, and the prevalence of abstainers was 12.6%. Males showed a higher HED prevalence than females (29.9% vs 8.2%). With regard to the place of residence, those students living outside the parents' home exhibit greater RC than those who live at the parents' home (41.3% vs 26.3%). As far as the maternal educational level is concerned, the higher the level, the greater the proportion of students who exhibit RC and HED. Regarding the age at onset of use, results showed a significant association between early onset of use and greater prevalence of RC and HED.

Table 2 shows univariate and multivariate ORs for the variables RC and HED. On the one hand, the model shows that high positive expectancies (OR = 4.77), early age at onset of use (OR = 4.75), and a higher maternal educational level (OR = 1.56) all constitute risk factors for RC. On the other hand, living with parents showed a protective effect on RC (OR = 0.39). Table 2 also shows that an early age at onset of use (OR = 7.16), being male (OR = 3.41), and having high positive expectancies (OR = 2.89) are risk factors for HED.

Discussion

In our study, the subject's sociodemographic characteristics, age at onset of use, and alcohol expectancies are associated with RC and HED.

Results showed that 12.2% of the subjects reported HED. This number is significantly lower than that of the university population in Italy (32.9%). Although in this case, the

reference of consumption was four or five drinks, depending on gender (D'Alessio et al., 2006). The prevalence of RC is 37.1%, a result similar to those reported by other authors (Londoño et al., 2005).

The prevalence of HED in males is significantly greater than in females, whereas the prevalence of RC does not show differences. This could probably be the result of the lower cutoff point used for RC in females. A higher risk factor for HED in the case of males is, in fact, consistent with the results described by Okoro et al. (2004).

The students' residence is also associated with RC. Living with their parents is a protective factor. The parents' greater control probably explains lower consumption. In contrast, this variable does not show an effect on HED. This lack of association could show how—when it comes to decision making about HED—the subject's autonomy has greater weight than RC.

The association found between the maternal educational level and the RC could probably be attributed to the subjects' greater economic resources. These results are consistent with those found, in Sweden, by Stafstrom et al. (2005).

Early age at onset of alcohol use arises as an important risk factor for both RC and HED. The tolerance generated by alcohol use could explain this effect, although we cannot ignore that this association could be, in part, the result of the different attitudes that parents have toward alcohol use. Those parents who "permit" alcohol use at an earlier age are also more likely to be more permissive with excessive consumption.

As far as the relationship between expectancies and alcohol use is concerned, results show that higher positive expectancies are associated with RC. Although we have not found any study on expectancies and RC, different studies have found a relationship between higher positive expectancies and higher alcohol consumption (Brown et al., 1985; Londoño et al., 2005). Callas et al. (2004) detected that negative expectancies constitute a protective factor for alcohol use (OR = 0.4, 95% CI: 0.3-0.6).

Finally, the analysis of expectancies and HED shows that higher positive expectancies are also a risk factor for HED. These results are consistent with those described in several studies, although they have used different measurement scales for expectancies (D'Alessio et al., 2006; Morarios and Natera, 2001; Turrissi and Wiersma, 1999). Our study has also highlighted significant differences in expectancies between genders. These results are consistent with those reported by other authors (Lundahl et al., 1997; Mooney et al., 1987; Rohsenow, 1983; Sher et al., 1996).

There are two possible limitations in our study. First, because the current analysis is based on cross-sectional data, the validity of the conclusions could be limited by the difficulty in differentiating between cause and effect. However, those factors that are associated with alcohol use are unlikely to change during the period of time in which the

dependent variable is measured. Consequently, a cross-sectional analysis provides results that are close to those of a longitudinal one (Rothman and Greenland, 1998). Second, given that the question about expectancies is not specifically validated, expectancies may not have been correctly measured.

Our results suggest that, to decrease consumption among adolescents in Spain, strategies should focus on modifying expectancies, limiting access to alcohol at young ages, and targeting students of higher socioeconomic status and those living away from home.

References

- BROWN, S.A., GOLDMAN, M.S., AND CHRISTIANSEN, B.A. Do alcohol expectancies mediate drinking patterns of adults? *J. Cons. Clin. Psychol.* **53**: 512-519, 1985.
- CALLAS, P.W., FLYNN, B.S., AND WORDEN, J.K. Potentially modifiable psychosocial factors associated with alcohol use during early adolescence. *Addict. Behav.* **29**: 1503-1515, 2004.
- CRABBE, J.C. Genetic contributions to addiction. *Annual Rev. Psychol.* **53**: 435-462, 2002.
- D'ALESSIO, M., BAIOTTO, R., AND LAGHI, F. The problem of binge drinking among Italian university students: A preliminary investigation. *Addict. Behav.* **31**: 2328-2333, 2006.
- D'AMICO, E.J. AND FROMME, K. A brief prevention for adolescent risk-taking behavior. *Addiction* **97**: 563-574, 2002.
- DEFENSOR DEL MENOR DE LA COMUNIDAD DE MADRID. Análisis del consumo de alcohol por los jóvenes en la Comunidad de Madrid (Analysis of the alcohol consumption among youths of Madrid Community). In: ESTUDIOS E INVESTIGACIONES, Madrid, Spain: Defensor del Menor en la Comunidad de Madrid, 2002, pp. 307-398.
- DUNN, M.E., LAU, H.C., AND CRUZ, I.Y. Changes in activation of alcohol expectancies in memory in relation to changes in alcohol use after participation in an expectancy challenge program. *Exp. Clin. Psychopharmacol.* **8**: 566-575, 2000.
- DUNN, M.E. AND YNIQUES, R.M. Experimental demonstration of the influence of alcohol advertising on the activation of alcohol expectancies in memory among fourth- and fifth-grade children. *Exp. Clin. Psychopharmacol.* **7**: 473-483, 1999.
- GOUDRIAAN, A.E., GREKIN, E.R., AND SHER, K.J. Decision making and binge drinking: A longitudinal study. *Alcsm Clin. Exp Res.* **31**: 928-938, 2007.
- HIBELL, B., ANDERSSON, B., BJARNASON, T., AHLSTRÖM, S., BALAKIREVA, O., KOKKEVI, A., AND MORGAN, M. The ESPAD Report 2003: Alcohol and Other Drug Use Among Students in 35 European Countries, Stockholm, Sweden: The Swedish Council for Information on Alcohol and Other Drugs (CAN), 2004.
- KENDLER, K.S. Twin studies of psychiatric illness: An update. *Arch. Gen. Psychiat.* **58**: 1005-1014, 2001.
- LONDOÑO, C., GARCÍA HERNÁNDEZ, W., LARA VALENCIA, S.C., AND VINACCIA, S. Expectativas frente al consumo de alcohol en jóvenes universitarios colombianos. *Anal. Psicol.* **21**: 259-267, 2005.
- LUNDAHL, L.H., DAVIS, T.M., ADESSO, V.J., AND LUKAS, S.E. Alcohol expectancies: Effects of gender, age, and family history of alcoholism. *Addict. Behav.* **22**: 115-125, 1997.
- MERIKANGAS, K.R., DIERKER, L.C., AND SZAMARI, P. Psychopathology among offspring of parents with substance abuse and/or anxiety: A high-risk study. *J. Child Psychol. Psychiat.* **39**: 711-720, 1998.
- MOONEY, D.K., FROMME, K., KIVLAHAN, D.R., AND MARLATT, G.A. Correlates of alcohol consumption: Sex, age and expectancies relate differentially to quantity and frequency. *Addict. Behav.* **12**: 235-240, 1987.

- MORA-RIOS, J. AND NATERA, G. Expectancies, alcohol drinking and associated problems in university students in Mexico City (Spanish). *Salud Pública Méx.* **43**: 89-96, 2001.
- NEWES-ADEYI, G., CHEN, C.M., WILLIAMS, G.D., AND FADEN, V.B. Trends In Underage Drinking In The United States, 1991-2003, Surveillance Report No. 74, Bethesda, MD: Division of Epidemiology and Prevention Research, National Institute on Alcohol Abuse and Alcoholism, 2005.
- OKORO, C.A., BREWER, R.D., NAIMI, T.S., MORIARTY, D.G., GILES, W.H., AND MOKDAD, A.H. Binge drinking and health-related quality of life: Do popular perceptions match reality? *Amer. J. Prev. Med.* **26**: 230-233, 2004.
- ROHSENOW, D.J. Drinking habits and expectancies about alcohol's effects for self versus others. *J. Cons. Clin. Psychol.* **51**: 752-756, 1983.
- ROTHMAN, K.J. AND GREENLAND, S. Types of epidemiologic study. In: ROTHMAN, K.J. AND GREENLAND, S. (Eds.) *Modern Epidemiology*, 2nd Edition, Philadelphia, PA: Lippincott-Raven, 1998, pp. 67-78.
- SAUNDERS, J.B., AASLAND, O.G., BABOR, T.F., DE LA FUENTE, J.R., AND GRANT, M. Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO Collaborative Project on Early Detection of Persons with Harmful Alcohol Consumption-II. *Addiction* **88**: 791-804, 1993.
- SHER, K.J., WOOD, M.D., WOOD, P.K., AND RASKIN, G. Alcohol outcome expectancies and alcohol use: A latent variable cross-lagged panel study. *J. Abnorm. Psychol.* **105**: 561-574, 1996.
- STAFSTRÖM, M., ÖSTERGREN, P.-O., AND LARSSON, S. Risk factors for frequent high alcohol consumption among Swedish secondary-school students. *J. Stud. Alcohol* **66**: 776-783, 2005.
- TAPERT, S.F. AND SCHWEINSBURG, A.D. The human adolescent brain and alcohol use disorders. In: GALANTER, M. (Ed.) *Recent Developments in Alcoholism*, Vol. 17: Alcohol Problems in Adolescents and Young Adults, New York: Kluwer Academic/Plenum, 2005, pp. 177-197.
- TURRISI, R. AND WIERSMA, K. Examination of judgments of drunkenness, binge drinking, and drunk-driving tendencies in teens with and without a family history of alcohol abuse. *Alcsm Clin. Exp. Res.* **23**: 1191-1198, 1999.
- TUUNANEN, M., AALTO, M., AND SEPPA, K. Binge drinking and its detection among middle-aged men using AUDIT, AUDIT-C and AUDIT-3. *Drug Alcohol. Rev.* **26**: 295-299, 2007.
- VARELA, J., BRAÑA, T., REAL, E., AND RIAL, A. Validación empírica do AUDIT (Cuestionario de Identificación dos trastornos debidos ó consumo de alcohol) na poboación xeral galega (Validation of AUDIT for Galician population), Santiago de Compostela, Spain: Xunta de Galicia, Consellería de Sanidade-Sergas, 2005.
- WHITE, A.M., KRAUS, C.L., AND SWARTZWELDER, H. Many college freshmen drink at levels far beyond the heavy threshold. *Alcsm Clin. Exp. Res.* **30**: 1006-1010, 2006.
- WORLD HEALTH ORGANIZATION. *Global Status Report on Alcohol 2004*, Geneva, Switzerland: Department of Mental Health and Substance Abuse, World Health Organization, 2004.
- XUNTA DE GALICIA. *Estudo das Necesidades de Información en Materia de Saúde da Poboación Juvenil Galega* (Galicians youths: Study of information necessities on Health), Santiago de Compostela, Spain: Xunta de Galicia, 2005.