Predictors of driving under the influence of alcohol among Spanish adolescents

Predictores de la conducción bajo los efectos del alcohol entre los adolescentes españoles

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Resumen

Este artículo pretende analizar los factores socioeconómicos que determinan conducir bajo los efectos del alcohol entre los adolescentes españoles. Particularmente, estamos interesados en analizar el impacto del entorno familiar y escolar. Para ello, utilizamos la Encuesta sobre Drogas en Población Escolar, correspondiente al año 2008, llevado a cabo por el Plan nacional sobre drogas del Gobierno de España. Este estudio con 30.183 estudiantes de edades comprendidas entre los 14 y los 18 años (M = 15.6; DT = 1.17), constituye una muestra representativa de dicha población estudiantil española. De ellos, el 6,7% afirmaron haber conducido bajo los efectos del alcohol, siendo esta conducta más frecuente entre los chicos (10,6%) que entre las chicas (2,9%). Regresiones logísticas revelan que las campañas informativas realizadas en los colegios reducen significativamente la probabilidad de conducir bebido (OR = 0,82), particularmente entre los chicos (OR = 0,73) y entre los estudiantes más jóvenes (OR = 0,66). Nuestros resultados también sugieren que aunque la educación de los padres tiene poco impacto, el consumo abusivo de alcohol por parte de los padres incrementa notablemente la probabilidad de conducir bebido (OR = 2.22 para las madres y OR = 2,81 parar los padres).

Palabras clave: campañas informativas, conducir, alcohol, jóvenes, España.

Abstract

This paper aims to examine the socio-economic determinants of alcohol-impaired drinking in Spanish adolescents. In particular, we are interested in analysing the impact of the family and school environment. To do it, we used the Spanish Survey on Drug Use in the School Population for the year 2008, carried out by the Spanish Government's Delegation for the National Plan on Drugs. This survey with 30,183 students between 14 and 18 years of age (M = 15.6; SD = 1.17) constitutes a representative sample of the Spanish student population. Of these, 6.7% reported having driven under the influence of alcohol, this behaviour being more frequent among boys (10.6%) than girls (2.9%). Logistic regressions reveal that informative campaigns at school could significantly reduce the likelihood of alcohol-impaired driving (OR = 0.82), especially among males (OR = 0.73) and among younger students (OR = 0.66). Our results also suggest that although parents' education has no significant impact, parent's alcohol abuse increase notably the probability of driving after drinking (OR = 2.22 for mothers and OR = 2.81 for fathers).

Key words: school campaigns, driving, drinking, adolescents, Spain.

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The combination of drinking and driving represents a social problem and a public health concern of first magnitude as it is an important cause of traffic accidents (European Monitoring Centre for Drugs and Drug Addiction (EMCDDA, 2007). This relationship could be more worrying if we analyze adolescent behaviour. In this sense, most drinkers start to drink in their adolescence, with adolescent drinking being a strong predictor of future drinking. Moreover, the earlier young people start drinking, the more likely they will drive after drinking too much and the more likely they will be involved in an accident because of their drinking (Hingson, Heeren, Levenson, Jamanka, & Voas, 2002).

Alcohol consumption affects the driver's skills and the driving behaviour, but when the driver is young, the risk of having an accident is higher. There are some reasons for this: the driver inexperience (Finken, Jacobs, & Laguna, 1998; Williams, 1998), the inexperience in alcohol consumption, the absence of a "tolerance learned" nevertheless it could exist a psychological tolerance (Ramos et al., 2008), and the risk underestimate behaviour such as not wearing safety belt, no wearing crash helmet, speed, and reckless driving (Bina, Graziano, & Bonino, 2006; Gullone & Moore, 2000; Moore & Parsons, 2000) among others. Adolescence is a risk vital period to begin the consumption of alcohol. A lot of adolescents don't worry about future consequences of risky behaviour. They are worried about how to live the moment. Risky driving appears to be part of a larger cluster of unsafe behavior that occurs in this age group (Harré, Brandt, & Dawe, 2000).

Developed countries and emerging economies have high indexes of alcohol consumption among students from the ages of 15-16 (Hibell et al., 2009). Furthermore, morbidity and mortality as a result of vehicle crashes is a problem that affects teenagers worldwide. Between European adolescents, traffic accidents are the main cause of death (Anderson & Baumberg, 2006). In Spain alcohol is a legal substance which has played a central role in Spanish culture for generations. Nowadays, alcohol is the most important drug among Spanish adolescents (Duarte, Escario, & Molina, 2009; Encuesta Estatal sobre Uso de Drogas en Estudiantes de Enseñanzas Secundarias (ESTUDES), 2008).

The permitted age to have a car driving license in Spain is 18 years old. However, there are two different teenager's driving licenses: AM license to ride a moped (until 2010 riding a moped was permitted from 14 years old; it changed to 15 years old permission afterwards), and A1 license to ride 125cm3 motorbikes from 16 years old.

A deep analysis about the driving and drinking behaviour in Spanish adolescents has not been carried out yet. One possible reason for this lack of analysis is the fact that it is compulsory to be 18 years old in order to have a car driving license. However, youngsters under 18 years old are a sensitive group with respect driving or riding after drinking. In this sense, 122,948 AM and 6,001 A1 licenses were issued among adolescents aged between 14 and 17 in Spain during 2010 by the Traffic Authority.

The aim of the present article is to identify individual, family socio-economic, and school characteristics that affect driving and riding under the influence of alcohol. This study has several important implications for policy makers, in order to design campaigns and information programs about the pernicious effects of the combination of alcohol and driving among adolescents.

Method

Participants

Participants are a nationally representative sample of Spanish students aged between 14 and 18 years old. The data used in this work comes from the last available "Encuesta Estatal Sobre Uso De Drogas en Estudiantes de Enseñanzas Secundarias (ESTUDES)" corresponding to 2008 and carried out by the Delegación del Gobierno para el Plan Nacional sobre Drogas (Spanish National Plan on Drugs). A total of 30,183 students were surveyed.

Measures

Adolescents were asked to report how many days they have been driving a motor vehicle under the influence of alcohol consumption during the last 12 months. Using this response we create our dependent variable, a dummy variable indicating whether or not the adolescent has driven a motor vehicle under the influence of alcohol, where 0 means "not driving after drinking" and 1 "driving after drinking".

The survey contains information on both individual and family socio-economic characteristics. Table 1 provides proper definitions of the dependent and independent variables used in this paper. As regards the sample's characteristics, approximately, 6.7% of the adolescents (2,022 people) have driven under the influence of alcohol consumption during the last 12 months. Boys and girls appear in the sample in similar proportions, 48.7% versus 51.3%. The proportion of immigrants is 10.5%, among them, 0.9% declared to come from a Muslim country, this is to say, a country where Muslims represent two thirds or more of the population. Most adolescents live with their mother, 96.8%, and with their father 84.5%. It is also high the proportion of students that live with one or more brothers and/or sisters, 76.6%. On the contrary, only a 1.6% of adolescents report living in a boarding school. The percentage of parents with a university degree is 19.0% for mothers and 19.6% for fathers. In general, the parents do not drink too much, thus, only 1.0% of fathers and 0.4% of mothers are reported as being heavy drinkers. On the other hand, 77.8% of students declared having received some kind of informative campaigns about the dangers of drinking and other drug behaviour.

Analysis

Logistic regression was used in order to evaluate the association between the independent variables and driving a motor vehicle under the influence of alcohol consumption. Firstly, we carry out a bivariate logistic regression for each independent variable separately. Secondly, we use the method backward stepwise, which involves starting with all candidate variables, testing the deletion of each variable using a chosen model comparison criterion, deleting the variable (if any) that improves the model the most by being deleted, and repeating this process until no further improvement is possible. We report the Odd Ratio (OR) in order to quantify the effect size. The OR yields the relative amount by which the probability of the outcome increases or decreases, depending on whether OR is greater or less than 1.0, when the independent variable increases in one unit.

Table 1
Descriptive analysis

Variable	Definition	Prevalence[a]
AlcoholDriving	This takes value 1 if the adolescent has driven a motor vehicle under the influence of alcohol in the last 12 moths and 0 otherwise	6.7%
Sex	This takes the value 1 if the young person is male and 0 if female	48.7%
Age14	This takes value 1 if the adolescent is 14 years old and 0 otherwise	20.1%
Age15	This takes value 1 if the adolescent is 15 years old and 0 otherwise	30.0%
Age16	This takes value 1 if the adolescent is 16 years old and 0 otherwise	26.1%
Age17	This takes value 1 if the adolescent is 17 years old and 0 otherwise	18.0%
Age18	This takes value 1 if the adolescent is 18 years old and 0 otherwise	5.9%
Inmigrant	This takes value 0 if the adolescent was born in Spain and 1 otherwise	10.5%
CountryMuslim	This takes value 1 if the adolescent was born in a country where most people (more than 66%) are Muslim	0.9%
InmigrantMother	This takes value 0 if the mother was born in Spain and 1 otherwise	13.3%
InmigrantFather	This takes value 0 if the father was born in Spain and 1 otherwise	12.4%
CountryMuslimMother	This takes value 1 if the mother was born in a country where most people (more than 66%) are Muslim	1.5%
CountryMuslimFather	This takes value 1 if the father was born in a country where most people (more than 66%) are Muslim	1.6%
LivewithMother	This takes value 1 if the adolescent lives with his/her mother and 0 otherwise	96.8%
LivewithFather	This takes value 1 if the adolescent lives with his/her father and 0 otherwise	84.5%
LivewithStepMother	This takes value 1 if the adolescent lives with his/her step mother and 0 otherwise	3.9%
LivewithStepFather	This takes value 1 if the adolescent lives with his/her step father and 0 otherwise	6.1%
LivewithBrother	This takes value 1 if the adolescent lives with his/her brothers/siters and 0 otherwise	76.6%
LivewithGrandParents	This takes value 1 if the adolescent lives with his/her grandparents and 0 otherwise	15.3%
LiveBoardingSchool	This takes value 1 if the adolescent lives with in a boarding school and 0 otherwise	1.6%
UnemployedMother	This takes value 1 if the mother of the adolescent is unemployed and 0 otherwise	4.3%
UnemployedFather	This takes value 1 if the father of the adolescent is unemployed and 0 otherwise	3.8%
UniversityMother	This takes value 1 if the mother has a university degree and 0 otherwise	19.0%
UniversityFather	This takes value 1 if the father has a university degree and 0 otherwise	19.6%
Income	Available income per week of the adolescent (in euros)	22.48€
AlcoholMother	This takes value 1 if the mother has abused of alcohol almost everyday and 0 otherwise	1.0%
AlcoholFather	This takes value 1 if the father has abused of alcohol almost everyday and 0 otherwise	0.4%
InformationCampaign	This takes value 1 if the adolescent studies at a school which has programmed information campaigns on the risks associated with tobacco, alcohol and drug consumption and 0 otherwise	77.8%
StateScohol	This takes value 1 if the school is a state/public school and 0 otherwise	67.4%
ProfessionalTraining	This takes value 1 if the young person is enrolled in professional-oriented branch "Ciclos Formativos de Grado Medio" and 0 otherwise	5.6%
PreUniversityTraining	This takes value 1 if the young person is enrolled in the university-oriented branch "Bachillerato" and 0 otherwise	29.9%

[a] Except for the Income variable where it appears its mean

Results

We present a more detailed descriptive analysis of the dependent variable in Table 2, thus, we present the prevalence of driving under the influence of alcohol for the total of the survey and distinguishing it by sex and age. It also appears the same descriptive analysis for the variable *AccidentDriving*, which indicates whether or not the student has had an accident driving a motor vehicle during the last year. This variable does not enable us to know the cause, and the seriousness of the accident, and can undervalue the number of people that have had an accident due to the fact that some of them can be at hospital or off sick, however, we think that the analysis can be interesting from a risk point of view. The results show that the prevalence of both impaired driving and accidents are higher among males than among females. Thus, the percentage of males that have driven under the influence of alcohol is more than three times (10.6% for males versus 2.9% for females). Similarly, 3.4% of males have had a motor vehicle accident as drivers while only 1.1% of females have had this kind mishap. The results also bear witness to a positive tendency in both variables as the students grow up. More specifically, the prevalence of impaired driving arises from 3.1% for adolescents being 14 years old to 11.1% for those who are 18 years old. Similarly, the prevalence of motor vehicle accidents ranges from 0.9% for the youngest students to 3.8% for the oldest students.

Table 2
Descriptive analysis

Variable	Total	Females	Males	Age14	Age15	Age16	Age17	Age18
AlcoholDriving	6.7%	2.9%	10.6%	3.14%	5.6%	8.2%	8.5%	11.1%
AccidentDriving	2.2%	1.1%	3.4%	0.9%	1.8%	2.7%	3.1%	3.8%
Males				47.2%	48.3%	49.8%	49.3%	49.8%

The coefficients, significance and OR of the bivariate logistic regression for each independent variable appear in Table 3. According to these estimates, there are significant differences among different adolescents. For example, the students whose mother drinks heavily have 5.66 times more probability of driving under the influence of alcohol than the rests of colleagues. Being a male also increases the odds of the behaviour by 3.95 times. Other high OR are for the *AlcoholFather* variable with a value of 3.24, for those who live in a boarding school (OR=2.37) and for those who choose a professional training (OR=2.28). On the contrary, adolescents have less probability of being involved in the response behaviour if, for example, their parents or them come from a Muslim country (OR=0.33 for the mother, OR=0.47 for the father, and OR=0.55 for the students). A similar result has been found for immigrants and US born Hispanic (Maldonado-Molina, Reingle, Jennings, & Prado, 2011). Furthermore, the probability of driving under the influence of alcohol is lower among those students who live with their mothers (OR=0.55) or those whose school has carried out some informative campaigns about the consequences of consuming alcohol and other drugs (OR=0.72).

The bivariate estimates can be wrong if we do not control the rest of confounding variables. It is well known that it is necessary to control these confounder factors in order to avoid a false positive Typo I error. Consequently, we use all the independent variables and estimate a logistic regression in order to take into account the effect of such confounders. We present results, which are displayed in Table 4, only for the variables that appear as significant using the backward method.

Comparing results of Table 3 and Table 4, we can notice that the OR of some variables remain more or less the same, for example for *Sex, LivewithBrother or InformationCampaing*. But on the other hand, these effects change in important magnitude for other variables such as *AlcoholMother* or *PreUniversityTraining*. These changes support the previous belief that some estimates in the bivariate logistic regression could be biased. Estimates reported in Table 4 also suggest that physical characteristics, such as sex and age, familiar environment and school characteristics exert an effect in the probability of driving under the influence of alcohol.

In accordance with these estimates, males have an OR of 3.83 in relation with females. We also see that the probability of driving after drinking increases with age. Apart from that, the higher OR values correspond to having a father and a mother who heavily drink with values of 2.81 and 2.22, respectively. On the contrary, belonging to a family where the mother is an immigrant from a Muslim country decreases the probability of driving under the influence of alcohol (OR=0.28). The variables that indicate whether or not students and their fathers come from a Muslim country become insignificant in the general regression. Once we have introduced the *MuslimCountryMother* variable, perhaps it is redundant to introduce the other two variables. Similarly, if the father is an immigrant the students have less probability of impaired driving.

Table 3
Bivariate logistic regression

Variable	Coefficient	SE	Wald	p-value	OR	95% CI
Sex	1.37	0.06	604.99	0.00	3.95	3.54-4.41
Age15	-0.26	0.05	23.21	0.00	0.77	0.69-0.86
Age16	0.32	0.05	39.35	0.00	1.38	1.25-1.52
Age17	0.34	0.06	35.81	0.00	1.40	1.25-1.56
Age18	0.61	0.08	58.52	0.00	1.85	1.58-2.16
Inmigrant	-0.12	0.08	2.18	0.14	0.89	0.71-04
CountryMuslim	-0.59	0.32	3.37	0.07	0.55	0.29-1.04
InmigrantMother	-0.24	0.08	9.67	0.00	0.79	0.68-0.92
InmigrantFather	-0.29	0.08	12.61	0.00	0.75	0.64-0.88
CountryMuslimMother	-1.12	0.32	12.10	0.00	0.33	0.17-0.61
CountryMuslimFather	-0.76	0.26	8.30	0.00	0.47	0.28-0.78
LivewithMother	-0.60	0.11	31.54	0.00	0.55	0.44-0.68
LivewithFather	-0.06	0.06	0.79	0.37	0.94	0.83-1.07
LivewithStepMother	0.46	0.11	18.59	0.00	1.59	1.29-1.97
LivewithStepFather	0.23	0.10	5.83	0.02	1.26	1.04-1.52
LivewithBrother	-0.17	0.05	9.77	0.00	0.84	0.76-0.94
LivewithGrandParents	0.26	0.06	16.92	0.00	1.30	1.15-1.47
LiveBoardingSchool	0.86	0.14	39.66	0.00	2.37	1.81-3.10
UnemployedMother	-0.05	0.12	0.16	0.69	0.95	0.76-1.20
UnemployedFather	-0.13	0.13	0.88	0.35	0.88	0.68-1.15
UniversityMother	-0.17	0.06	7.35	0.01	0.84	0.74-0.95
UniversityFather	0.01	0.06	0.01	0.90	1.01	0.90-1.13
Income	0.00	0.00	261.24	0.00	1.00	1.00-1.00
AlcoholMother	1.73	0.22	64.08	0.00	5.66	3.70-8.66
AlcoholFather	1.18	0.16	57.40	0.00	3.24	2.39-4.40
InformationCampaign	-0.33	0.06	36.16	0.00	0.72	0.64-0.80
StateScohol	0.30	0.05	32.92	0.00	1.36	1.22-1.51
ProfessionalTraining	0.82	0.08	112.49	0.00	2.28	1.95-2.65
PreUniversityTraining	-0.05	0.05	1.02	0.31	0.95	0.86-1.05

Note: SE = Standard Error; OR = Odd Ratio; CI = confidence interval for the odds ratio

Table 4
Backward logistic regression

Variable	Coefficient	SE	Wald	p-value	OR	95% CI
Sex	1.34	0.07	421.05	0.00	3.83	3.37-4.36
Age15	0.64	0.11	36.39	0.00	1.90	1.54-2.35
Age16	1.32	0.11	147.42	0.00	3.75	3.03-4.65
Age17	1.40	0.12	146.51	0.00	4.06	3.24-5.10
Age18	1.61	0.14	141.24	0.00	4.99	3.83-6.51
InmigrantFather	-0.43	0.11	16.30	0.00	0.65	0.53-0.80
CountryMuslimMother	-1.28	0.46	7.70	0.01	0.28	0.11-0.69
LivewithBrother	-0.17	0.06	7.40	0.01	0.84	0.74-0.95
LiveBoardingSchool	0.46	0.18	6.54	0.01	1.59	1.11-2.26
AlcoholMother	0.80	0.32	6.07	0.01	2.22	1.18-4.19
AlcoholFather	1.03	0.21	24.40	0.00	2.81	1.87-4.24
InformationCampaign	-0.20	0.07	9.06	0.00	0.82	0.72-0.93
StateScohol	0.27	0.06	17.26	0.00	1.30	1.15-1.48
PreUniversityTraining	-0.56	0.07	61.21	0.00	0.57	0.50-0.66
Constant	-4.29	0.13	1076.10	0.00	0.01	

Note: SE = Standard Error; OR = Odd Ratio; CI = confidence interval for the odds ratio

With reference to the school characteristics, we have found that those that are sent to a boarding school participate in the behaviour analysed in a higher proportion (OR=1.59), the same could be said about those who attend a State school (OR=1.30). Conversely, the percentage of adolescents who drive under the influence of alcohol is lower in schools that carried out campaigns about the risks of drug consumption (OR=0.82) and among those that study a pre-university training program (OR=0.57). We should highlight that informative campaigns are not developed as a national designed experiment with a control group and an homogeneous treatment for the rest of schools. In fact, schools decide whether or not to carry out the campaign, the methods to be utilised, the length and all the characteristics of the campaign. As a consequence, the campaigns implemented in the different schools could be very heterogeneous. Thus, although these circumstances limit the causal interpretation of the effects of these campaigns, the significance of the estimated coefficient and its magnitude could be interpreted as some evidence that support the hypothesis that the realisation of informative campaigns reduce the probability of impaired drinking.

An interesting analyse is to compare whether estimates vary by sex or age. With that end in mind, Table 5 presents estimates for females and males and Table 6 reports estimates for younger adolescents (14-15 years) and older adolescents (16-18 years). The most relevant fact that we find in these tables is that the variable *InformationCampaign* is not significant across all the subsamples. Thus, school information campaigns significantly reduce the probability of driving after drinking for males and for the younger group, with Odds Ratios (0.73 and 0.66, respectively) smaller than the overall OR found in Table 4. This heterogeneity could help to explain why there is insufficient evidence regarding the effectiveness of school information campaigns. These estimates highlight the extend to which impaired driving is linked to parent's alcohol abuse, this is specially true in the case of the father. In this way, the variable that control whether the father abuse of alcohol is clearly significant across all the estimates and have high Odds Ratios, between 2.35 for females and 3.20 for the younger group.

Table 5
Backward logistic regression by sex

a) Females

Variable	Coefficient	S.E.	Wald	p-value	OR	95% CI
Age15	0.66	0.22	8.98	0.00	1.94	1.26-3.00
Age16	1.58	0.22	49.12	0.00	4.83	3.11-7.51
Age17	1.46	0.24	35.93	0.00	4.31	2.67-6.95
Age18	1.58	0.28	31.57	0.00	4.86	2.80-8.43
InmigrantFather	-0.41	0.20	4.35	0.04	0.66	0.45-0.98
LivewithBrother	-0.32	0.12	6.87	0.01	0.72	0.57-0.92
AlcoholFather	0.85	0.37	5.21	0.02	2.35	1.13-4.89
StateScohol	0.54	0.14	14.73	0.00	1.71	1.30-2.25
PreUniversityTraining	-0.64	0.14	20.20	0.00	0.53	0.40-0.70
Constant	-4.60	0.23	397.93	0.00	0.01	

b) Males

Variable	Coefficient	S.E.	Wald	p-value	OR	95% CI
Age15	0.65	0.12	28.16	0.00	1.91	1.50-2.43
Age16	1.25	0.12	100.04	0.00	3.48	2.72-4.44
Age17	1.39	0.13	111.16	0.00	4.01	3.10-5.19
Age18	1.63	0.15	111.38	0.00	5.11	3.78-6.92
InmigrantFather	-0.47	0.13	13.68	0.00	0.63	0.49-0.80
CountryMuslimMother	-1.02	0.47	4.70	0.03	0.36	0.14-0.91
LiveBoardingSchool	0.48	0.20	5.90	0.02	1.61	1.10-2.37
AlcoholMother	0.89	0.38	5.62	0.02	2.44	1.17-5.08
AlcoholFather	1.12	0.26	19.04	0.00	3.08	1.86-5.10
InformationCampaign	-0.31	0.07	17.92	0.00	0.73	0.63-0.85
StateScohol	0.17	0.07	5.69	0.02	1.19	1.03-1.37
PreUniversityTraining	-0.53	0.08	42.02	0.00	0.59	0.50-0.69
Constant	-2.91	0.13	526.48	0.00	0.05	

Note: SE = Standard Error; OR = Odd Ratio; CI = confidence interval for the odds ratio

Table 6
Backward logistic regression by age group

a) 14-15 years

Variable	Coefficient	S.E.	Wald	p-value	OR	95% CI
Sex	1,43	0,11	162,75	0,00	4,18	3,35-5,20
Age15	0,64	0,11	35,80	0,00	1,90	1,54-2,35
InmigrantFather	-0,49	0,19	6,83	0,01	0,61	0,42-0,88
CountryMuslimMother	-1,56	1,03	2,30	0,13	0,21	0,03-1,58
LivewithMother	-0,88	0,24	13,96	0,00	0,41	0,26-0,66
LivewithStepFather	0,49	0,18	7,09	0,01	1,63	1,14-2,34
LivewithBrother	-0,26	0,11	5,80	0,02	0,77	0,63-0,95
AlcoholFather	1,16	0,35	10,90	0,00	3,20	1,60-6,38
InformationCampaign	-0,42	0,12	12,79	0,00	0,66	0,52-0,83
Constant	-3,12	0,27	132,12	0,00	0,04	

b) 16-18 years

Variable	Coefficient	S.E.	Wald	p-value	OR	95% CI
Sex	1,31	0,08	263,42	0,00	3,70	3,16-4,34
Age16	-0,33	0,10	9,84	0,00	0,72	0,59-0,88
Age17	-0,24	0,11	4,87	0,03	0,79	0,64-0,97
InmigrantMother	-0,47	0,13	12,95	0,00	0,62	0,48-0,81
CountryMuslimMother	-1,05	0,53	3,98	0,05	0,35	0,12-0,98
LivewithStepMother	0,38	0,17	4,96	0,03	1,46	1,05-2,04
AlcoholMother	0,78	0,37	4,35	0,04	2,18	1,05-4,52
AlcoholFather	1,06	0,25	18,05	0,00	2,88	1,77-4,68
StateScohol	0,32	0,08	14,26	0,00	1,38	1,17-1,63
PreUniversityTraining	-0,59	0,07	69,16	0,00	0,55	0,48-0,64
Constant	-2,91	0,14	453,93	0,00	0,05	

Note: SE = Standard Error; OR = Odd Ratio; CI = confidence interval for the odds ratio

Discussion

The present study reveals that driving after drinking among Spanish adolescents is a widespread behaviour. Thus, around 6.7% of students reported driving under the influence of alcohol. This figure could appear low compared with other studies like Labrie, Kenney, Mirza, & Lac (2011), who report a prevalence of 19.1%, but taking into account that their average participant age was 20.01 years, and our average participant age is 15.60 years, we can conclude that our percentage of participation in the behaviour of analysis is quite high. In the light of this, we should emphasize that driving after drinking can have dramatic consequences for those adolescents who engage in that behaviour, such as death or serious physical and mental injuries. These latter consequences can affect their possibilities of studying and, consequently, their chances of getting better jobs in the future.

Our study adds to previous literature providing new evidence that driving under the influence of alcohol is a widespread behaviour, not just by adult people but also by students aged between 14 and 18 years. It also helps in order to identify the factors that influence on such behaviour, in this case, we have concentrated our efforts on the familiar and school environment of adolescents. We have found that physical, family background and school characteristics are important variables in explaining the decision of being an impaired driver. Consequently, not only should policy makers be involved in the battle of reducing this dangerous activity, but also families and teachers. Thus, it is clear that driving under the influence of alcohol is more likely among males and among older students. As a result, parents should pay more attention to these groups.

At the same time, the strong association between parent's alcohol behaviour and impaired driving provides evidence about a possible causal link. This could be due to the fact that parents that drink take less care about the upbringing of their sons and daughters, but also, because children could be less obedient when the parents do not observe the rules they are trying to impose upon their children. Similarly, the estimates indicate that having a native father increase the probability of driving after drinking. In like manner, those who live in a boarding school drive after drinking in

a higher proportion. In this sense, these findings suggest the need for more research in order to understand the role of family characteristics in the interpretation of the results, and consequently, in order to validate or question our hypothesis. We found that the probability of driving under the influence of alcohol is lower among those students who live with their mothers. That result could be explained for the traditional mother's role. Some authors talk about Sex Role Orientation (SRO). This concept refers to attitudes, values, opinions, behavior standards and cultural rules that define the appropriate behavior of men and women in society (Qualls, 1982). Although there is no unique way of defining SRO, there is a habitual distinction between couples with a traditional SRO and couples with a modern SRO. The former are characterized by clearly defined roles in the couple, especially in the case of women (women-mother, women-housework, women-care children). The latter have flexible, undefined roles with a modern and liberal character (Madill & Bailey, 1999; Qualls, 1982). In the other hand, some authors have found that maternal socialization was related to reduced odds of smoking and drinking, and family structure is indicative of distinct family processes that are linked to risky behaviors among adolescents (Brown & Rinelli, 2010).

With respect to the school characteristics, and having the limitation mentioned above, it appears that the realization of informative campaigns about the consequences of alcohol and drug consumption in schools, reduce the proportion of students involved in driving under the influence of alcohol (OR=0.82). Most of this relationship comes from the male group (OR=0.73) and the youngest group (OR=0.66). According to this, it would appear that males and youngest students are more receptive to information campaigns at school.

This result is especially encouraging at least for two reasons. First, the quantitative impact is statistically significant and contributes to additional evidence in a field where the evidence about the effectiveness of school-based programs against driving after drinking has been claimed to be insufficient (Elder et al., 2005). Secondly, the magnitude of the impact is quite encouraging, as these campaigns reduce the probability of being involved in impaired drinking in almost 20 points (18%). Moreover, this result opens the question: could more specific campaigns, oriented to emphasize the risks of driving after drinking, be more effective? Conventional wisdom appears to suggest a positive answer, which is encouraging for policy makers. This is to say, a more specific campaign should yield better results over a specific outcome than a more general campaign. In the light of this, some authors recommend that school campaigns should be a part or should be integrated in a more general community effort in order to improve the results (Simons-Morton & Simons-Morton, 1989). In fact, there are evidences that college community programs with a strong enforcement component produced substantial reductions in drinking and driving among teenagers and young adults (Mccartt, Hellinga, & Wells, 2009). There are some educational projects that have proved successful to teach children/youth about the dangers of alcohol abuse, using computer games at school (Healy, Connolly, & Dickie, 2008). Interventions directed at alcohol among young people can benefit including teachers as a campaign target.

The current study has some limitations that should be highlighted. Some of them appear for using cross-sectional data. Thus, this kind of data does not permit to control for unobserved heterogeneity in contrast to panel or longitudinal data. In like manner, we can not control for changes in family characteristics or other variables, once again, panel data permits such analysis. Moreover, self-reported data could be subject to measurement errors due to underreporting, however, we hope that this issue should not be important given that the survey is anonymous. Measurement errors could also be a consequence of memory bias. The dependent variable considers driving after the influence of alcohol in the last year. Although it is not difficult to know if you have driven under the influence of alcohol recently, the probability of giving a proper answer reduces as the behaviour happened around one year ago, which is the temporal horizon we are taking into account.

Other limitations refer to the survey. First, some representative facts can be mentioned. Participants are students aged between 14 and 18 years old. Some students could be under-represented. For example, education is compulsory until the age of 16, consequently, the representation of the population aged less than 16 years old is better represented than the population aged 16 or older given that some students have abandoned the education system. Similarly, even when education is compulsory, some groups can be under-represented due to the fact that they pay less attention to education and skip classes more frequently. Secondly, other drawbacks refer to lack of some interesting information. For example, the survey does not provide information on blood alcohol concentration, it is well known that the probability of having an accident increases with the alcohol consumption. Few are the papers that include this information (Campos et al., 2013).

Despite these limitations, we believe that our results are plausible enough to provide several plausible implications from a policy perspective. First of all, our work provides some evidence that informative campaigns could be effective in reducing the probability of driving after drinking, a behaviour that appears as highly prevalent for adolescents. This is important in order to help to convince policy makers who could be sceptical about the results of policy interventions in this field because some authors have concluded that the evidence is not clear (Elder et al., 2005). In the light of this, campaigns should incorporate as an aim the necessity of reducing driving after drinking. To this end, it is impor-

tant to promote the knowledge of the consequences of driving after drinking and, in general, after using drugs. This kind of campaigns, not only will they reduce the number of adolescents that drive under the influence of alcohol, but they also reduce the number of passengers that decide to go in a car with an impaired driver.

Secondly, one important result of the paper is that there are some groups of adolescents that are in higher risks than others. In this sense, males and older students, for example, are at higher risk of driving under the influence of alcohol. Similarly, adolescents who attend class in schools that do not provide informative campaigns about alcohol and drug consumption are also in higher risk. Consequently and even knowing that driving after drinking behaviour is the result of a broad complex decision in which physiological, psychosocial, familiar and school factors are involved, these target groups should be considered as the more important targets by policy makers in the design of the policies. The paper also shows that, once the age is controlled for, adolescent who are more probable to continue their formation, this is to say, they follow a professional or university training, have less risk of driving after drinking, this implies that those who are going to drop school before the average have more probability of impaired driving, and consequently, they should constitute a preferred target of policy makers.

Finally, our results also provide evidence that prevention should not be only a matter of authorities. Thus, the family and more particularly parents should take part in order to make adolescents aware of the risks of driving under the influence of alcohol. Austin & Chen (2003) found that parental guidance decreased alcohol use directly and indirectly by lessening influences of positive affect toward alcohol advertising. Programs to prevent adolescent risk behavior should take into account environmental and personality influences (Shope, Raghunathan, & Patil, 2003). Similarly, parents' alcohol behaviour has a positive effect on the probability of impaired driving by their children; consequently, they must not transmit the idea that alcohol is a normal habit. According to our results, the school system can as well contribute to reduce impair driving with campaigns that improve the knowledge of the risks of this behaviour. Anti-alcohol campaigns can benefit including parents as a campaign target (Austin & Chen, 2003; Jack, Bouck, Beynon, Ciliska, & Lewis, 2005).

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Conflict of interest

None.

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