Salud Mental 2010;33:309-316

Subjective valoration of risk perception and alcohol consumption among Spanish students

Ana I. Gil-Lacruz,[1] Marta Gil-Lacruz[2]

Artículo original

SUMMARY

Introduction

Although Spanish adolescents recognize that reiterative alcohol abuse has negative consequences over consumers and society in general, the percentages of teenagers who get drunk during the weekends keep alarming high.

Young people are exposed to a wide range of messages about the externalities related to alcohol consumption whose connotation and importance are divergent. Our main goal is to analyze which channels are the most effective to reduce alcohol abuse. To that end, we focus on a theoretical framework which combines the forming of risk perceptions with the decision of consuming alcoholic beverages.

We focus on young people because alcohol consumption patterns consolidate in adolescence and adolescents are also highly sensitive to peerpressure, and in general, to social forces.

Materials and methods

The main contribution of this paper lies in analyzing how the different sources of information (relatives, friends, teachers, official organism, mass media, seminars, hooked people and publications) configure risk perceptions.

To address the issue of endogeneity between risk perception and risky behaviors, we consider a simultaneous equation system, and to analyze the robustness of the results, we carry out two more different specifications: a model in which these endogenous variables are included but treated as exogenous and a model in which these variables are excluded.

We have drawn sub-populations of 21344, 26530 and 25521 high-school students from the Spanish National Surveys on Drug Use in the School Population 2000, 2002 and 2004.

We have also used the Harmonised Consumer Price Indexes (HCPI) as a proxy of the alcoholic beverages' prices. These indexes, provided by the Spanish National Statistical Institute, are statistical measures which summarize the evolution of the acquisition capacity of the resident population in Spain to buy alcoholic drinks across Spanish provinces (n=50). Because these indexes also compute for geographical and temporal differences (for example, some Spanish provinces are important wine producers or some years have been specially good or bad for the agricultural sector given weather or economic conditions), we have introduced time and geographical dummy variables in order to control for these two dimensions.

Results

Our results validate the theoretical framework. The riskier the students consider the consumption of alcoholic beverages, the lower is their alcohol demand. This empirical evidence is fundamental in justifying the design of public polices oriented to inform young people about the real risks of consuming drugs.

This paper also brings to light that the most effective channels to inform young people are official organisms, parents and siblings, mass media, talks and seminars, and teachers. The other way around, friends seem to exert a negative influence.

The main conclusion we draw from these results is that alcohol consumption is a social issue. To design effective anti-drug policies, we have to take into account adolescents' social environments: families, friends and schools, among others. It is fundamental to inform parents and teachers, and in general to reach the highest population section as possible. The good piece of news is that people who surround adolescence are getting more and more involved with their education; parents and teachers are sharing the responsibility of informing adolescents about drugs.

Key words: Alcohol, youth, information, perceptions.

RESUMEN

Introducción

Aunque los jóvenes españoles reconocen que el abuso reiterado de bebidas alcohólicas tiene consecuencias negativas sobre los propios consumidores y la sociedad en general, el porcentaje de adolescentes que se emborrachan durante los fines de semana se mantiene preocupantemente elevado.

Los jóvenes están expuestos a una amplia variedad de mensajes sobre las drogas cuya importancia y significado pueden ser divergentes. Nuestro principal objetivo es analizar qué canales son los más efectivos para reducir el abuso de alcohol. Para ello, nos centramos en un marco teórico que combina la formación de las percepciones de riesgo con la decisión de consumir bebidas alcohólicas.

El motivo por el que nos centramos en los jóvenes es por representar el grupo poblacional más vulnerable en relación con la experimentación con las drogas. Esta vulnerabilidad es consecuencia de dos factores principales. Por un lado, los patrones de consumo de las drogas se consolidan en la adolescencia, y por otro, los adolescentes son especialmente vulnerables a la presión del grupo de iguales. El

[1] Universidad Autónoma de Madrid, Departamento de Análisis Económico.
[2] Universidad de Zaragoza, Departamento de Psicología y Sociología. División de Psicología Social.

Correspondencia: Dra. Ana I. Gil-Lacruz. Ciudad Universitaria de Cantoblanco. 28049, Madrid, España. Tel: +34–91 497-2959; Fax: +34–91 497-8616; E-mail: ana.gil@uam.es

Recibido primera versión: 17 de agosto de 2009. Segunda versión: 8 de enero de 2010. Aceptado: 11 de marzo de 2010.

alcohol cumple un papel primordial en la experimentación con las sustancias adictivas, pues su abuso representa un paso previo al consumo de otras drogas más duras.

Datos y método

La principal contribución de este artículo radica en analizar cómo las diferentes fuentes de información (familiares, amigos, profesores, organismos oficiales, medios de comunicación, seminarios, personas con problemas de adicción y publicaciones) configuran la percepción de riesgo.

La muestra poblacional consta de 21344, 26530 y 25521 estudiantes de secundaria procedentes de las Encuestas sobre Drogas a la Población Escolar 2000, 2002 y 2004.

También hemos empleado el Índice de Precios Armonizado (IPCA) como una aproximación de los precios de las bebidas alcohólicas. Estos índices de precios, proporcionados por el Instituto Nacional de Estadística, son medidas estadísticas que resumen la capacidad de compra de los ciudadanos residentes en las distintas provincias españolas (n=50). Por lo tanto, estos índices también recogen diferencias temporales y espaciales (como que una provincia sea productora de vino o que en un año hubiera una mala cosecha de uva), por lo que introdujimos variables ficticias temporales y geográficas que controlen dichos efectos.

Para abordar el tema de la endogeneidad entre la percepción de riesgo y los comportamientos arriesgados, consideramos un sistema de ecuaciones simultáneas, y para analizar la robustez de los resultados, llevamos a cabo dos especificaciones adicionales: un modelo en que las variables potencialmente endógenas son incluidas pero tratadas como exógenas, y otro modelo en que son excluidas.

Resultados

Nuestros resultados validan las hipótesis teóricas, pues encontramos evidencia empírica de que los estudiantes que consideran las bebidas alcohólicas más perniciosas, las demandan menos. Este resultado es fundamental para justificar el diseño de políticas públicas orientadas a informar a los jóvenes sobre el riesgo real de consumir drogas.

Este artículo también demuestra que las fuentes de información más efectivas para los jóvenes son los organismos oficiales, los padres y hermanos, los medios de comunicación, las charlas y seminarios, y los profesores. Al contrario, los amigos ejercen una influencia negativa.

La heterogeneidad no observada podría generar resultados desviados, en parte al menos en la relación subyacente entre las fuentes de información y las percepciones de riesgo de los estudiantes. Hemos analizado si las variables que determinan la formación de la percepción de riesgos, como las características socio-demográficas, pueden influir también en la tendencia a recibir información mediante canales diferenciales.

La principal conclusión que extraemos de esta investigación es que los políticos deberían continuar ofreciendo campañas antidroga a la gente joven, prestando por ello atención a sus ambientes sociales: familias, amigos y colegios, principalmente. Es importante acceder al mayor número de estudiantes posible, pero también informar a sus padres y profesores. El argumento para el optimismo es que en España los padres y profesores se involucran cada vez más en la educación antidroga de los jóvenes.

Palabras clave: Alcohol, juventud, información, percepción.

INTRODUCTION

In modern societies, the search for enjoyment highlights the pleasures obtained from alcohol consumption versus the negative externalities. The real price of consuming alcoholic beverages is no restraint to their monetary values but it also includes aspects such as social conflicts, worse state of health or lower career expectancies. It is exactly the avoidance of future potential problems what determines the preventive character of informative campaigns.

According to the Spanish National Survey on Drug Use in the School Population (2004),[1] 22% of students with ages between 14 and 18 years have been drunk at least once in the last 30 days. Young people are usually targeted as the most vulnerable population group to drug experimentation. On the one hand, alcohol consumption patterns consolidate in adolescence and, on the other hand, adolescents are highly sensitive to peer-pressure, and in general social forces.[2] Most Spanish students are aware of the risks related to alcohol abuse (73% of the interviewed answered that drinking alcohol has a negative influence over health). However, a high percentage of these students (54%) do not consider alcohol as a drug.

Although informative anti-drug campaigns are usually offered by the State, that does not mean they are free, so we have to conjecture how to improve their efficiency and efficacy. The main goal of this research is to analyze the influence of the information source (relatives, friends, teachers, official organism, mass media, seminars, hooked people and publications) on the forming of risk perceptions. According to socio-cognitive theories, such as the Planned Action Theory, we tend to adopt healthier behaviors if those who surround us consider these behaviors as positive. The key point of these theories is the consideration of people close to us in the adoption of healthy behaviors.[3] This environmental influence is the main reason why we introduce in our model the information transferred by people who belong to the students' social networks.

LITERATURE REVIEW

The main reason why informative campaigns are usually offered by the public sector is the presence of inefficiencies in the private demand for healthy goods and services that promotes higher social inequalities.[4,5] Governmental informative initiatives are wide ranging, from legislative actions (for example, labels) to preventive messages (such as TV adverts that encourage teenagers to look for alternative leisure activities).

Most developed countries promote preventive services. Through educative campaigns, policy makers pretend to

improve citizens' state of health by the adoption of healthier life styles. There is empirical evidence about the positive impact of information in shaping risk perceptions and, therefore, in developing human capital.[6-8] Although the transmission of preventive messages is positive, the relevance is reduced in most empirical studies.[9,10]

One reason that explains this lack of effectiveness is the economical power of alcohol industries, which invest huge budgets in marketing strategies much higher than those allocated by governments to drug prevention.[11]

Therefore, the individual perceived risk depends on a compendium of messages that might be quite different, or even contradictory. Marketing adverts emphasize the pleasures obtained from drinking whereas preventive campaigns highlight negative consequences. Concerning this informative divergence, it is essential to comprehend how people internalize health information when they demand alcoholic beverages.[12] The goal of preventive campaigns is to provide information that could help the consumers to take rational decisions; to understand the link between information and choices; and to determine if the market forces might be able to correct these informative deficiencies.[13]

The adequacy of providing more information to the consumers generates opposite points of view. Some authors defend the idea that consumers are wrongly informed,[14] whereas others affirm that consumers take decisions knowing risks, being only the risk scale diffuse.[15] On the other hand, higher information endowments do not always promote desirable healthy behaviors, and what is worse, anti-drug campaigns might also spread false alarms by wrong risk definitions.[16]

THEORETICAL FRAMEWORK

The study of risk perceptions helps us to identify a model that predicts human behaviors. Thus, for example, individuals who consider alcohol abuse dangerous will be less willing to abuse alcoholic beverages. In the first economical studies about risk perceptions (π_i), the forming of risk perceptions was structured by three informational resources: past risk assessment (q_i), individual experience (p_i) and information endowment from, for example, mass media or product labels (r_i).

$$(1) \quad \pi_i = \omega p_i + \gamma q_i + \zeta r_i$$

The effect of an informative change over the perceived risk is obtained by differentiating (1) with respect to the endowment of information.[12,17,18] The theoretical hypothesis we want to validate is that the influence of anti-drug information on students' alcohol demand differs in sense and magnitude by informative channels.

The effectiveness of informative campaigns lies in closing the gap between objective risk and individual perceived risk, that is, on the capacity to correct the deviation between the information that people have and the information that they should get to make adequate decisions. As not everybody processes information in the same way, informative campaigns should be designed in order to reach especially the most vulnerable population groups. Risk perception is a subjective judgment that depends hugely on the individual's reasoning capacity. This capacity depends on previous individual beliefs defined by different institutions (families, schools or churches, among others), socio-economic characteristics, and even the fact of being a person prone to behave riskily (smoke, drive over the speed limits…).[19] What is more, alcohol risk perceptions also depend on the status of being a drinker.[20]

DATA AND EMPIRICAL FRAMEWORK

We have drawn sub-populations of 21344, 26530 and 25521 high-school students from the Spanish National Surveys on Drug Use in the School Population 2000, 2002 and 2004, which have been carried out by the Spanish Ministry of Health and Consumption. Consideration has been only given to those students whose ages fall between 14 and 18 years.

We have also used the Harmonised Consumer Price Indexes (HCPI)[21] to get a price index of alcoholic drinks. These indexes, provided by the Spanish National Statistical Institute, are statistical measures which summarise the evolution of the acquisition capacity of the population residing in Spain to buy alcoholic drinks across Spanish provinces (n=50). Because these indexes also compute for geographical and temporal differences, we have introduced time dummy variables (*Year2000*, *Year2002* and *Year2004*) and geographical dummy variables (*North*, *South*, *Centre*, *East*, *Islands* and *Madrid*) in order to control for these two dimensions.

The dependent variables are *AlcoholConsumer* and *AlcoholRisk*. The first one indicates whether or not the adolescent has drunk alcoholic beverages in the last 30 days, and the second one measures how dangerous the adolescent perceives his/her alcohol consumption to be. To address the issue of frequency and quantity in relation to alcohol consumption, we consider *AlcoholAbuse* as an alternative for *AlcoholConsumer*. This new variable is more restricted, and it indicates whether or not the adolescent has been drunk at least once during the last 30 days. In the last 30 days, 60% of the interviewed students have consumed alcoholic drinks and 22% affirm to have been drunk at least once. Pairwise comparisons confirm with a significance level of 5% that *AlcoholConsumer* and *AlcoholAbuse* are negatively correlated with *AlcoholRisk*.

As explanatory variables, we have considered the following ones: *Male*, *Age*, *FatherCollege*, *MotherCollege*,

FatherWork, *MotherWork*, *LivingBothParents*, *Budget*, *Information (Parents&Siblings*, *OtherRelatives*, *Friends*, *Teachers*, *OfficialOrganism*, *MassMedia*, *Talks&Seminars*, *HookedPeople*, *Publications)* and *AlcoholPrice* (Table 1).

Regarding the access of anti-drug campaigns, the channels that reach the highest number of high-school students are mass media (64%), parents and siblings (59%), teachers (47%) and friends (46%).

Once we have defined the theoretical model and organized the data base, we focus on the development of the empirical framework. From equation (1), we estimate the forming of the individual risk perception as follows:

$$(2)\quad AlcoholRisk_i = \alpha_0 + \alpha_1 X_{1i} + \alpha_2 X_{2i} + \alpha_3 X_{3i} + \alpha_4 Area_i + \alpha_5 Time_i + u_i$$

where X_{1i} represents prior risk perception, X_{2i} individual experience and X_{3i} direct information transfer. Prior risk perceptions are not observable, so we will assume that their effect is taken into account under the constant term. Individual experiences are covered under *AlcoholConsumer*, *Male*, *Age*, *FatherCollege*, *MotherCollege*, *FatherWork*, *MotherWork*, *LivingBothParents* and *Budget*. Direct

Table 1. Descriptive statistics

Variable	Description	Mean	(SD)
Endogeneous			
AlcoholConsumer	This takes the value 1 if the student has consumed alcoholic beverages in the last 30 days, 0 otherwise.	0.6041	(0.4890)
AlcoholAbuse	This takes the value 1 if the student has been drunk at least one in the last month, 0 otherwise.	0.2220	(0.4156)
AlcoholRisk	This takes a value according to the individual risk perception of drinking alcoholic beverages (1 no problems; 2 not may problems; 3 several problems; 4 too much problems)	2.3029	(0.9696)
Exogeneous			
Male	This takes the value 1 if the student is male, 0 otherwise	0.4886	(0.4998)
Age	This variable informs us about the age of the student	15.6856	(1.1752)
FatherCollege	This takes the value 1 if the student's father completed College, 0 otherwise.	0.2100	(0.4073)
MotherCollege	This takes the value 1 if the student's mother completed College, 0 otherwise.	0.1816	(0.3855)
FatherWork	This takes the value 1 if the student's father works, 0 otherwise.	0.8951	(0.3063)
MotherWork	This takes the value 1 if the student's mother works, 0 otherwise.	0.5952	(0.4908)
LivingBothParents	This takes the value 1 if the student lives with both parents, 0 otherwise	0.8681	(0.3383)
Budget	This variable informs us about the budget the student has available per week (deflated to year 2001)	15.6135	(16.3606)
Information:Parents&Siblings	This takes the value 1 if the students received anti-drug information by parents and/or siblings, 0 otherwise.	0.5807	(0.4934)
Information:OtherRelatives	This takes the value 1 if the students received anti-drug information by other relatives, 0 otherwise.	0.3101	(0.4625)
Information:Friends	This takes the value 1 if the students received anti-drug information by friends, 0 otherwise.	0.4641	(0.4987)
Information:Teachers	This takes the value 1 if the students received anti-drug information by teachers, 0 otherwise.	0.4749	(0.4993)
Information:OfficialOrganism	This takes the value 1 if the students received anti-drug information by official organism, 0 otherwise.	0.2458	(0.4306)
Information:MassMedia	This takes the value 1 if the students received anti-drug information by mass media, 0 otherwise.	0.6368	(0.4808)
Information:Talks&Seminars	This takes the value 1 if the students received anti-drug information by talks and/or seminars, 0 otherwise.	0.4598	(0.4983)
Information:HookedPeople	This takes the value 1 if the students received anti-drug information by people who suffered the consequences of consuming drugs, 0 otherwise.	0.2753	(0.4466)
Information:Publications	This takes the value 1 if the students received anti-drug information by brochures and/or other kind of publications, 0 otherwise.	0.4049	(0.4908)
AlcoholPrice	Harmonized price index of alcoholic beverages through Autonomous Communities (year base 2001).	105.3732	(11.8490)

We have also included three time dummy variables (*Year2004*, *Year2002*, *Year2000*) and six regional variables (*Madrid*, *Center*, *South*, *North*, *East* and *Islands*)

information transfers are considered by source of *Information*. We also introduce time dummy variables that inform us which year the individual was interviewed and regional dummy variables that inform us in which geographical area the individual lives.

On the other hand, the consumption decision equation adopts the following structure:

$$(3)\quad AlcoholConsumer_i^* = \beta_0 + \beta_1 Y_{1i} + \beta_2 AlcoholRisk_i + \beta_3 Area_i + \beta_4 Time_i + \varepsilon_i$$

Y_{1i} represents socio-demographic characteristics (*Male, Age, FatherCollege, MotherCollege, FatherWork, MotherWork, LivingBothParents, AlcoholPrice* and *Budget*). Once again, we consider time and regional dummy variables.

The estimations of equations (2) and (3) may lead to biased and inconsistent coefficients if for example there is a third factor correlated with both *AlcoholRisk* and *AlcoholConsumer*. To address the issue of endogeneity, we follow a two stage procedure with a dichotomous endogenous variable[22] (*AlcoholConsumer*). In the first stage, the reduced form equation of *AlcoholConsumer* is estimated using a probit model, and then *AlcoholRisk* is estimated by ordinary least square replacing *AlcoholConsumer* with its predicted value. In the second stage, the reduced form equation of *AlcoholRisk* is estimated using ordinary least squares, and then *Alcohol Consumer* is estimated by a probit model introducing the standard error of the previous equation and the original value of *AlcoholRisk*.

As instrument for the variable *AlcoholConsumer* we use a variable that we assume affects the consumer decision but it does not predict risk perceptions: *AlcoholPrice*. Following the same argumentation line, as instruments for the variable *AlcoholRisk* we focus on the different sources of *Information*.

There is another important source of endogeneity: the nature of the link between risk perceptions and information endowments. For example, individuals who suffered from the negative consequences of alcohol abuse might be more curious to get information about alcohol secondary effects. However, we assume that circumstances are more powerful explaining the health outcomes than vice versa. The main implication is that the estimated coefficients must be understood as measures of association, rather than casual relationships.

Lastly, we repeat estimations with *AlcoholAbuse* instead of *AlcoholConsumer*.

RESULTS

To address the issue of endogeneity between risk perception and risky behaviors, we consider a simultaneous equation system (Model A), and to analyze the robustness of the results, we carry out two more different specifications: a model in which these endogenous variables are included but treated as exogenous (Model B) and a model in which these variables are excluded (Model C) (Tables 2 and 3).

Table 2. Estimation of the percentage of alcohol consumers (probit models: mfx)

	AlcoholConsumer			AlcoholAbuse		
	Model A_1 (PR^2 =10.20%)	Model B_1 (PR^2 =9.98%)	Model C_1 (PR^2 =9.34%)	Model A_2 (PR^2 =1.76%)	Model B_2 (PR^2 =1.75%)	Model C_2 (PR^2 =1.66%)
AlcoholRisk	-0.0435***	-0.0439***	—	-0.0105***	-0.0105***	—
Male	-0.0320***	-0.0313***	-0.0217***	-0.0048***	-0.0050*	-0.0022
Age	0.1228***	0.1237***	0.1230***	0.0246***	0.0243***	0.0239***
FatherCollege	0.0459***	0.0251***	0.0225***	-0.0046	-0.0061	-0.0063
MotherCollege	0.0211***	0.0012	-0.0007	0.0055	0.0039	0.0031
FatherWork	0.0201***	0.0265***	0.0285***	-0.0132***	-0.0122***	-0.0119***
MotherWork	0.0327***	0.0380***	0.0376***	-0.0034	-0.0026	-0.0026
LivingBothParents	-0.0524***	-0.0158***	-0.0152***	-0.0135**	-0.0069	-0.0064
Budget	0.0050***	0.0038***	0.0038***	0.0008***	0.0009***	0.0009***
AlcoholPrice	-0.0009***	-0.0011***	-0.0010***	0.0009	0.0023	0.0026
North	0.0388***	0.0583***	0.0572***	-0.0171***	-0.0146***	-0.0152***
South	-0.0562***	-0.0355***	-0.0311***	-0.0255***	-0.0247***	-0.0251***
Center	0.0855***	0.1029***	0.1048***	-0.0188***	-0.0175***	-0.0173***
East	0.0202***	0.0498***	0.0482***	-0.0174***	-0.0146***	-0.0154***
Islands	-0.0401***	-0.0673***	-0.0702***	-0.0603***	-0.0642***	-0.0651***
Madrid[a]	—	—	—	—	—	—
Year2004	0.0083	0.0292	0.0340	-0.0536***	-0.0542***	-0.0531***
Year2002	-0.0816***	-0.0598	-0.0566	0.0032	-0.0030	-0.0036
Year2000[a]	—	—	—	—	—	—
SE	-17.1517***	—	—	-2.2674**	—	—

[a] Variables of reference
* Significant at 10% level; ** Significant at 5% level; *** Significant at 1% level.
Model A is a simultaneous model of AlcoholRisk and AlcoholConsumer, in Model B these potentially endogenous variables are treated as exogenous and in Model C these variables are excluded as explanatory factors.

Table 3. Estimation of the alcohol risk perception (Ordinary Least Square Regression: coefficients)

	Model A_1 (AR^2 = 2.27%)	Model B_1 (AR^2 =2.91%)	Model C_1 (AR^2 =2.26%)	Model A_2 (AR^2 =3.94%)	Model B_2 (AR^2 =3.97%)	Model C_2 (AR^2 =3.92%)
AlcoholConsumer	-0.1765	-0.1727***	—	—	—	—
AlcoholAbuse	—	—	—	2.0950***	-0.0559***	—
Male	-0.2164***	-0.2166***	-0.2140***	-0.2336***	-0.2346***	-0.2346***
Age	0.0191	0.0188***	0.0002	-0.0482***	-0.0004	-0.0017
FatherCollege	0.0529***	0.0528***	0.0498***	0.0482***	0.0328***	0.0332***
MotherCollege	0.0449***	0.0450***	0.0451***	0.0356***	0.0430***	0.0427***
FatherWork	-0.0123	-0.0126	-0.0169	0.0063	-0.0175	-0.0168*
MotherWork	0.0103	0.0101	0.0047	0.0043	-0.0038	-0.0037
LivingBothParents	0.0038	0.0036	0.0056	0.0131	-0.0024	-0.0021
Budget	-0.0024***	-0.0023***	-0.0028***	-0.0043***	-0.0023***	-0.0023***
Information:Parents&Siblings	0.0466***	0.0466***	0.0453***	0.0708***	0.0636***	0.0638***
Information:OtherRelatives	0.0109	0.0111	0.0167**	0.0218***	0.0222***	0.0222***
Information:Friends	-0.0256*	-0.0262***	-0.0422***	-0.0673***	-0.0341***	-0.0349***
Information:Teachers	0.0242***	0.0243***	0.0256***	0.0229***	0.0235***	0.0235***
Information:OfficialOrganism	0.0453***	0.0451***	0.0393***	0.0389***	0.0418***	0.0417***
Information:MassMedia	0.0325***	0.0327***	0.0362***	0.0696***	0.0524***	0.0528***
Information:Talks&Seminars	0.0324***	0.0322***	0.0309***	0.0301***	0.0258***	0.0260***
Information:HookedPeople	-0.0200	-0.0204***	-0.0363***	-0.0849***	-0.0312***	-0.0326***
Information:Publications	-0.0036	-0.0035	-0.0028***	0.0161***	0.0085	0.0087***
North	0.0113	0.0110	0.0035	0.0376**	0.0031	0.0039
South	-0.0868***	-0.0868***	-0.0809***	-0.0331	-0.0817***	-0.0799***
Center	-0.0662***	-0.0664***	-0.0820***	-0.0335***	-0.0701***	-0.0692***
East	0.0096	0.0095	0.0037	0.0479*	0.0087	0.0096
Islands	0.0847***	0.0846***	0.0977***	0.2521***	0.1028**	0.1067***
Madrid[a]	—	—	—	—	—	—
Year2004	-0.0788***	-0.0791***	-0.0871	0.0193	-0.0812***	-0.0785***
Year2002	-0.0292***	-0.0293***	-0.0236	-0.0366***	-0.0225***	-0.0229***
Year2000[a]	—	—	—	—	—	—
Intercept	2.2182***	2.2218***	2.4336	2.6806***	2.4517***	2.4587***

[a] Variables of reference
* Significant at 10% level; ** Significant at 5% level; *** Significant at 1% level.
Model A is a simultaneous model of AlcoholRisk and AlcoholConsumer, in Model B these potentially endogenous variables are treated as exogenous and in Model C these variables are excluded as explanatory factors.

The first of our theoretical hypothesis is validated as there is empirical evidence that higher self-assessed levels of risk determine lower alcohol consumption. Female students have a higher tendency to demand alcoholic beverages, and the oldest students are also the most likely to demand alcoholic beverages. If the students' parents have college studies and work, students are more likely to demand alcoholic beverages than those individuals whose parents do not have college studies or do not work. Living with both parents reduces the students' disposition to drink. Monetary variables determine alcohol consumption in the expected way: prices and available budgets are negatively correlated with the demand for alcoholic beverages.

We do not observe special differences among models what is a guarantee of the estimated parameters' robustness. The estimated error of *AlcoholRisk*'s reduced form (*SE*) is not statistically significant, so there is no strong empirical evidence that unobservable characteristics figure out the forming of alcohol risk perception and the decision of consuming alcoholic beverages. So there are not enough arguments to justify the use of model A versus model B.

Comparing the estimations of *AlcoholAbuse* with the ones of *AlcoholConsumer*, we highlight that, as expected, *AlcoholRisk* is a stronger determinant for *AlcoholConsumer* than for *AlcoholAbuse*.

Regarding the forming of risk perceptions, the second of our theoretical hypothesis is also validated by our results: those students who have consumed alcoholic beverages in the last 30 days perceive alcohol consumption as less dangerous than those students who have not drunk at all. Male students consider that drinking alcohol is less dangerous than females, and the youngest students are more naïve than the oldest ones. If the students' parents have college degrees, students consider the consumption of alcohol riskier.

Regarding monetary variables, we have just introduced the student's available weekly budget. The empirical evidence suggests that higher available budgets are related to lower levels of perceived risk. Concerning the allocation of information we find out that in model A, the coefficients related to six out of nine sources are statistically significant and, what is more, they exert a positive influence in the assessment of higher levels of risk, with the important

Table 4. Estimation of channels through which student received anti-drug information (probit models: mfx)

	Parents siblings	Other relatives	Friends	Teachers	Official organism	Mass media	Talks and seminars	Hooked people	Publications
Male	0.0187***	0.0455***	-0.0390***	-0.0258***	0.0702***	-0.0255***	-0.0705***	-0.0477***	-0.0665***
Age	-0.0056***	-0.0159***	0.0327***	-0.0226***	0.0132***	0.0228***	0.0242***	0.0429***	0.0078***
FathxerCollege	0.0249***	-0.0185***	0.0052	-0.0312***	0.0451***	0.0278***	-0.0125**	0.0115***	0.0050
MotherCollege	0.0244***	-0.0167***	-0.0021	-0.0121**	0.0181***	0.0087	0.0114**	0.0011	0.0172***
FatherWork	0.0313***	0.0144**	0.0049	-0.0041	0.0031	-0.0035	0.0103	-0.0084	0.0090
MotherWork	0.0090**	0.0103***	0.0222***	0.0007	0.0072**	-0.0019	0.0049	0.0169***	0.0037
LivingBothParents	0.0309***	-0.0259***	-0.0037	0.0291***	0.0167***	0.0324***	0.0243***	-0.0328***	-0.0011
Budget	0.0002**	0.0006***	0.0010***	-0.0004***	-0.0001	-0.0011***	-0.0005***	0.0012***	-0.0005***
North	-0.0467***	-0.0197***	-0.0168***	0.0516***	0.0418***	-0.0340***	-0.0835***	-0.0122**	-0.0304***
South	-0.0385***	0.0077	-0.0343***	0.0675***	-0.0172***	-0.0246***	-0.0043	-0.0133**	-0.0420***
Center	-0.0336***	-0.0147***	-0.0390***	0.0558***	0.0560***	-0.0213***	0.0422***	-0.0336***	0.0042
East	-0.0580***	-0.0231***	0.0222***	0.0768***	0.0149***	-0.0331***	0.0074	0.0119**	-0.0285***
Islands	-0.0459***	0.0105	0.0219***	0.0793***	0.0585***	-0.0484***	-0.0468***	0.0213***	-0.0617***
Madrid[a]	—	—	—	—	—	—	—	—	—
Year2004	0.0289***	0.0168***	-0.0851***	0.0366***	0.1055***	-0.0253***	0.1137***	-0.0216***	0.0949***
Year2002	0.0300***	0.0170***	-0.0695***	0.0168***	0.0221***	0.0066	0.0282***	-0.0254	0.0215***
Year2000[a]	—	—	—	—	—	—	—	—	—

[a] Variables of reference
* Significant at 10% level; ** Significant at 5% level; *** Significant at 1% level.
Standard errors in brakes

exception of information transferred by friends. The sources that seem to be more effective in the forming of risk perceptions are the following ones by order of importance: official organism, parents and siblings, mass media, talks and seminars and teachers. Regarding the time evolution, students tend to value the consumption of alcoholic beverages as less dangerous along the time. Regarding Model B and Model C, we also find evidence that other relatives' drug information is useful in informing of risk perceptions, whereas the information provided by hooked people and publications exert a negative influence.

Comparing the estimations of *AlcoholAbuse* with the ones of *AlcoholConsumer*, we observe that in the case of *AlcoholAbuse* the influence of alcohol consumption is not as clear as in the case of *AlcoholConsumer*. Once we control for endogeneity, *AlcoholAbuse* even changes the sense of influence from a negative to a positive magnitude.

Lastly, we analyze how individual characteristics determine the acquirement of information. To that end, we have carried out nine independent probit estimations in which the dependent variables are the channels of anti-drug information (Table 4).

Among the main results, we highlight that being male is positively correlated with having received anti-drug information by family members and official organism, while being female is positively correlated with the rest of the channels.

Regarding socio-economic characteristics, we observe that if parents completed college studies, the student is more likely to have received anti-drug information from parents and siblings, official organisms and mass media. If the mother completed college studies, the student is more likely to have received information from publications, and less likely to have received information from talks and seminars. If the parents completed college studies, the student is less likely to have received information by other relatives and teachers. If the parents work, the student is more likely to have spoken about drugs with family members. Although the estimated coefficients of educative variables do not differ substantially by the gender of the parent, these differences are underlined for labor variables. If the father works, the student is less likely to have received anti-drug information from teachers, mass media and hooked people. If the mother works, the student is more likely to have spoken with friends and have received information by hooked people. Living with both parents is positively correlated with receiving anti-drug information from parents, teachers, official organisms, mass media, talks and seminars, and the other way around, it is negatively correlated with receiving information from other relatives and hooked people.

The student's weekly budget is positively correlated with having spoken with family members, friends and hooked people. On the other hand, it is negatively correlated

with having received anti-drug information by teachers, mass media, talks and seminars and publications.

The time dummy variables reveal that nowadays more people get anti-drug information from family members, teachers, official organism, talks and seminars and publications. On the other hand, there is a lower tendency to get this information from friends, mass media and hooked people.

DISCUSSION

In this paper we have found evidence that the riskier the students consider the consumption of alcoholic beverages, the lower is their alcohol demand. This empirical evidence is fundamental in justifing the design of public polices and educative strategies oriented to inform young people about the real risk of consuming drugs.

In addition to confirming that it is important to keep people informed about the real consequences of consuming drugs, it is essential to discover which channels are the most effective. This paper brings to light that the most effective sources to inform young people are official organisms, parents and siblings, mass media, talks and seminars, and teachers. The other way around, friends seem to exert a negative influence in valuing the risk of consuming these drugs.

An important caveat about these results is that the sources of information about drugs may be endogenous. We do not have experimental data to control, for example, that different students were assigned to be exposed to different sources of anti-drug information. Instead, we are analyzing observational data, where students report the sources of information to which they have been exposed.

The main conclusion we extract from these results is that policy makers and public mental health officers should continue offering anti-drug campaigns to young people but paying more attention to their social environments. It is fundamental to inform parents and teachers, and in general to reach the highest population section as possible.[23] The good piece of news for the Spanish case is that people who surround adolescents are getting more and more involved with the students' education; more parents and teachers are sharing the responsibility of informing adolescents about the dangers of consuming drugs.

ACKNOWLEDGMENTS

This paper was carried out while Ana Gil was a post-doc fellow at Cornell University. The authors are indebted to Donald S. Kenkel for their valuable comments, to the Spanish Ministry of Science for the financial help (SEJ 2006-07864) and to the Spanish Ministry of Health and Consumption for providing the data base. The authors are also very grateful for the comments received from two anonymous referees of *Salud Mental*. The usual disclaimers apply.

REFERENCES

1. Spanish National Survey on Drug Use in the School Population. Spanish Government's Delegation for the National Plan on Drug. Madrid, Spain: 2000, 2002 and 2004.
2. Ortiz A, Soriano A, Galván J, Meza D. Tendencias y uso de cocaína en adolescentes y jóvenes de la Ciudad de México. Sistema de reporte de información en drogas. Salud Mental 2005;28:91-97.
3. Pender NJ, Pender AR. Attitudes, subjective norms, and intentions to engage in health behaviors. Nursing Research 1986;35:15-18.
4. Case A, Paxson C. Mothers and others: who invests in children's health?. Journal of Health Economics 2001;20:301-328.
5. Case A, Lubotsky D, Paxson C. Economic status and health in childhood: the origins of the gradient. Working Paper NBER 2001;8344.
6. Carbone JC, Kverndokk S, Rørgeberg OJ. Smoking, health, risk and perception. J Health Economics 2005;24:631-653.
7. Hsieh C, Yen L, Liu J, Lin C. Smoking, health knowledge and anti-smoking campaigns: an empirical study in Taiwan. J Health Economics 1996;15:87-104.
8. Kenkel DS. Health behavior, health Knowledge and schooling. J Political Economy 1991;99:287-305.
9. Fishbein M, Hall-Jamieson K, Zimmer E, von Haeften I et al. Avoiding the boomerang: Testing the relative effectiveness of antidrug public service announcements before a national campaign. American J Public Health 2002;92:238-245.
10. Saffer H, Chaloupka F. The effect of tobacco advertising bans on tobacco consumption. J Health Economics 2000;19:1117-1137.
11. Laux F. Addiction as a market failure: using rational addiction results to justify tobacco regulation. J Health Economics 2000;19:421-437.
12. Viscusi WK. Smoking status and public responses to ambiguous scientific risk evidence. Southern Economic J 1999;66:250-270.
13. Kenkel DS. Prevention. In Culyer, A.J. and Newhouse, J.P. (eds.), Handbook of health economics. Elsevier, Amsterdam: 2000.
14. Slovic P. What does it mean to know a cumulative risk? Adolescents' perceptions of short-term and long-term consequences of smoking. J Behavioral Decision Making 2000;13:259-266.
15. Viscusi WK. Do smokers underestimate risks? J Political Economy 1990;98:1253-1269.
16. Smith V, Desvousges W, Johnson F, Fisher A. Can public information programs affect risk perceptions? J Policy Analysis Management 1990;9:41-59.
17. Viscusi WK. Age variations in risk perceptions and smoking decisions. Review Economics Statistic 1991;73:577-588.
18. Viscusi WK, Magat WA, Huber J. Communication of ambiguous risk information. Theory Decision 1991;31:159-173.
19. Costa J, Rovira J. Relative mortality risk and the decision to smoke. Working paper FEDEA 2000.
20. Villa Moral Jiménez M, Ovejero Bernal A, Sirvent Ruiz C, Rodriguez Díaz FJ et al. Efectos diferenciales sobre las actitudes ante la experimentación con alcohol y la percepción de riesgo en adolescentes españoles consumidores de cannabis y alcohol. Salud Mental 2009;31:125-138.
21. Spanish National Statistical Institute. Inebase. Available at http://www.ine.es/inebase/menu3_soc_en.htm. Access date: May 29; 2009.
22. Lundborg P, Lindgren B. Risk perceptions and alcohol consumption among young people. J Risk Uncertainty 2002;25:165-183.
23. Nuño Gutiérrez BL, Álvarez Nemegyei JA, Velázquez Castañedo A, Tapia Curiel A. Comparación del ambiente familiar y el tipo de consumo de tabaco en adolescentes mexiacanos de nivel medio superior. Salud Mental 2008;31:361-369.

Artículo sin conflicto de intereses