Alcohol and Alcoholism Vol. 46, No. 3, pp. 261–269, 2011
Advance Access Publication 11 March 2011
doi: 10.1093/alcalc/agr019

COGNITIVE ASPECTS

Drinking Motives among Spanish and Hungarian Young Adults: A Cross-National Study

Zsófia Németh[1,2], Róbert Urbán[3,4], Emmanuel Kuntsche[5,6,7], Emilio Moreno San Pedro[8], Jesús Gil Roales Nieto[9], Judit Farkas[1], Lilla Futaki[1], Bernadette Kun[1,10], Barbara Mervó[1], Attila Oláh[3] and Zsolt Demetrovics[1,10,*]

[1]Institutional Group on Addiction Research, Eötvös Loránd University, PO Box 179, H-1580 Budapest, Hungary, [2]National Institute for Health Development, Budapest, Hungary, [3]Department of Personality and Health Psychology, Eötvös Loránd University, Budapest, Hungary, [4]Smoking Cessation Center, Budapest, Hungary, [5]Addiction Info Switzerland, Research Institute, Lausanne, Switzerland, [6]Research Group on Adolescent Health, Institute for Social and Preventive Medicine, University of Lausanne, Lausanne, Switzerland, [7]Behavioural Science Institute (BSI), Radboud University, Nijmegen, The Netherlands, [8]Department of Clinical, Experimental and Social Psychology, University of Huelva, Huelva, Spain, [9]Department of Personality, Assessment and Psychological Treatment, University of Almería, Almería, Spain and [10]National Institute for Drug Prevention, Budapest, Hungary

*Corresponding author. Tel.:+36-30-97-610-97; Fax: +36-1-461-2695; E-mail: demetrovics@t-online.hu

(*Received* 22 *September* 2010; *in revised form* 30 *December* 2010; *accepted* 9 *February* 2011)

Abstract — **Aims:** To investigate differences and similarities in college students' drinking motives in Spain and in Hungary. **Methods:** A total of 550 Spanish (mean age 22.7, SD = 3.2) and 997 Hungarian (mean age 22.4, SD = 2.7) college students completed the Drinking Motive Questionnaire Revised Short Form (DMQ-R SF) and answered other alcohol-related questions. Data were analyzed by confirmatory factor analysis, *t*-test and structural equation modeling. **Results:** The DMQ-R SF demonstrated good psychometric properties in both countries. The rank order of the motives (social > enhancement > coping > conformity) was identical in the two countries. However, Hungarian students scored higher on enhancement, social and coping motives than Spanish students. In both the Hungarian and the Spanish population, enhancement motives were associated with drinking frequency and drunkenness, while coping motives were associated with alcohol-related problems. Among Spanish students, a significant relationship was found between alcohol-related problems and enhancement motives as well. **Conclusion:** Despite the substantial differences in the drinking culture of both countries, drinking motives showed overwhelming similarities (e.g. rank order of motives and the particular relationships between motives and alcohol outcomes). Only few differences (e.g. Hungarian college students indicated a higher level of motives) were found in cross-national comparison. Our results imply that programs targeting risky drinking motives are likely to be successfully adapted to different drinking cultures in Europe.

INTRODUCTION

Alcohol consumption is one of the main risk factors of premature death and avoidable diseases (Rehm *et al*., 2003a). Europe is the heaviest drinking region of the world, and it has the highest level of alcohol-attributable burden of disease (Rehm *et al*., 2006). One-tenth of the EU population, 58 million adults (15%), is estimated to drink to harmful levels (over 20 g alcohol among women and over 40 g among men per day). Especially, young people are at risk, as over 10% of female mortality and around 25% of male mortality in the 15–29 age group are related to harmful alcohol use in the EU (Anderson and Baumberg, 2006). Alcohol-related harms include a wide range of negative consequences such as loss of productivity, violence, injuries, academic failure, unintended pregnancy, sexually transmitted diseases, cardiovascular diseases, cancer etc. (Babor *et al*., 2004).

Understanding the reasons or motives why young people engage in alcohol use is essential for the reduction of excessive drinking and alcohol-related harms. Research indicated that psychological motives of drinking represent the final decision whether to drink or not to drink and therefore they are the most proximal factor for engaging in drinking (Carpenter and Hasin, 1998; Cooper, 1994; Cooper *et al*., 2010; Cox and Klinger, 1988; Kuntsche *et al*., 2006a,b). Motives mediate other important determinants of drinking such as personality and expectancies (Catanzaro and Laurent, 2004; Cooper *et al*., 1995; Kuntsche *et al*., 2007, 2011; Urbán *et al*., 2008). Moreover, motives explain up to 50% of the variance in adolescent alcohol use (Kuntsche, 2007).

According to Cox and Klinger (1988, 1990), drinking motives can be classified along two dimensions. Individuals decide to drink or not to drink on the basis of 'positive/negative' rewards and of 'internal/external' sources. Cooper (1994) used these considerations to develop the Drinking Motives Questionnaire Revised (DMQ-R), which measures four distinct drinking motive categories: enhancement (internal and positive motives such as drinking 'to have fun'); social (external and positive motives such as drinking 'to be sociable'); coping (internal and negative motives such as drinking 'to forget problems'); and conformity (external and negative motives such as drinking 'to fit in with a group').

Investigating the role of culture in alcohol motives is of great importance. The cultural position of alcohol essentially influences the alcohol use in a society (Room, 1992), and this relationship is mediated by alcohol motives (Kuntsche *et al*., 2007) To date, only a few studies have conducted cross-national comparisons of drinking motives to examine the role of cultural factors (for notable exceptions, see, for example, Gire, 2002; Kuntsche *et al*., 2008b; Nagoshi *et al*., 1994; Piko *et al*., 2007).

Reviewing the literature, we identified four studies on the cross-national comparison of drinking motives, which did not provide univocal evidence. While a study of Kuntsche *et al*. (2008a) on the level and structure of drinking motives and links to alcohol outcomes across industrialized and highly developed countries such as the USA, Canada and Switzerland found only minor differences, other studies investigating cultures with more salient differences reported greater diversities. For instance, US students endorsed more social (celebratory) reasons for drinking than Japanese students (Nagoshi *et al*., 1994). Another study compared motives of alcohol use in an individualist culture (USA) and

in a collectivist culture (Nigeria: Gire, 2002). The description of individualist societies emphasizes loose ties between individuals, autonomy and personal responsibility, while in collectivist societies, people from birth onwards are integrated into strong, cohesive in-groups, often extended families which continue protecting them in exchange for unquestioning loyalty (Hofstede, 2001). Results showed that US respondents scored higher on coping motives and lower on social motives than Nigerian students, suggesting that cultural factors such as subordinating individual goals might have a significant impact on drinking motives. Examining drinking motives among Hungarian and US high school students, Piko *et al*. (2007) found that among Hungarian students only social motives explained alcohol use in boys and girls, whereas in the US sample all the examined motive dimensions were associated with alcohol use only in girls. Among the boys, the coping (affect regulation) motive was associated with drinking only. The authors argued that differences in motives were due to the large-group social activities among peers connected to substance use in Hungary (Piko *et al*., 2007). On the basis of these studies, we can conclude that only minor differences in drinking motives emerge, unless countries with entirely different drinking cultures (e.g. from different continents) are compared. One important aim to advance cross-cultural knowledge on drinking motives is therefore to study the impact of distinct (drinking) cultures within the same continent (e.g. Europe).

The present study investigates cross-national differences in the drinking motives of Hungarian and Spanish young adults. These two countries offer an excellent opportunity for cross-cultural research since they are characterized by different drinking habits in Europe (Anderson and Baumberg, 2006). In the last two decades, drinking patterns have dynamically changed in Europe (Kuntsche *et al*., 2011; Simons-Morton *et al*., 2009). This change is characterized by some converging trends and at the same time by an increased vulnerability of Eastern European countries to alcohol. After the collapse of the communist bloc in 1989, alcohol consumption increased and by now the overall volume of consumption in Central and Eastern Europe is the second highest in the world (Rehm *et al*., 2003b). Popova *et al*. (2007) characterized the drinking style typical for the region by the term 'predominantly irregular binge drinking pattern'. Popova *et al*. (2007) found that in Eastern Europe the highest proportion of heavy alcohol consumption was registered among women in Hungary. Hungarian drinking culture has always been characterized by frequent heavy consumption, which means it cannot be labeled as either a dry or wet drinking pattern. However, the sudden socioeconomic and political transition lead to the increase of consumption which can be explained by the break-up of small communities, the transformation of the family system and the increasing role of media and consumerism (Gazso and Stumpf, 1992; Kopp and Réthelyi, 2004; Kuntsche *et al*., 2011).

Data show that the originally high prevalence of alcohol use is decreasing in Western European countries, while the traditionally low prevalence is increasing in Eastern Europe (Kuntsche *et al*., 2011). A study based on data on Health Behaviour in School-aged Children found that the lifetime prevalence of drunkenness of 15-year-old adolescents between 1997/98 and 2005/06 declined in Western European countries (particularly among boys) and increased in Eastern European countries (both genders; Kuntsche *et al*., 2011). Similarly changing trends can be observed at the cross-national level, between Spain and Hungary. While until 1989 the recorded consumption of alcohol in Spain exceeded that of Hungary, thereafter consumption started decreasing continuously in Spain and remained stable or increased slightly in Hungary. In 2005, 10.4 l of alcohol were consumed per capita in Spain, whereas the consumption was 12.5 l in Hungary as assessed among adults (European Health For All Database, 2010). In terms of heavy drinking, the Mediterranean drinking culture of Spain seems to be protective. In 2008, the risk of death caused by chronic liver disease and cirrhosis in the ages 0–64 years was 6.7 times higher in Hungary than in Spain (36.9/100,000 persons and 5.5/100,000 persons, respectively) according to European Health For All Database (2010). Spain can be characterized by a different sociocultural position of drinking: people report mainly custom- and meal-related reasons to drink, and alcohol-related mortality and frequency of intoxication are rather low (Alvarez and del Rio, 1994; Room and Mäkele, 2000). Data on risky episodic drinking illustrates that the proportions of young adults in the ages 18–24 years who drank at least once a week with a consumption of five or more standard drinks in one sitting were 12.2% in Hungary and 8.6% in Spain (Global Status Report on Alcohol, 2004). At the age of 15 itself, there is a sharp difference in the prevalence of lifetime drunkenness among boys (in Hungary 40%, in Spain 29%), whereas no difference was detected among girls (in Hungary 32%, in Spain 33%: Currie *et al*., 2006).

Considering these cultural differences and trends, the objectives of this study were (a) to test the structural and measurement invariance between Hungarian and Spanish groups of college students regarding the DMQ Revised Short Form (DMQ-R-SF), (b) to identify differences and similarities in the average level of endorsement of the four drinking motives between Hungarian and Spanish students and (c) to test in which cultures which drinking motives are associated with risky alcohol use and alcohol-related harms. On the basis of previous studies, our hypothesis was that given the higher prevalence of problematic alcohol use in the Hungarian population, we will find higher mean values for all alcohol motives. Furthermore, we hypothesized that the structure of the questionnaire will be invariant across cultures. We supposed that the rank order of the motives will be equivalent in both cultures. And finally, we assumed that the association of the coping motive with alcohol-related problems and the association of enhancement motives with frequency of drinking and drunkenness will be equivalent across cultures.

METHODS

Sample and procedure

Participants were recruited in spring 2009 at three Spanish and three Hungarian universities. In all universities, teachers who held courses at the different faculties within the framework of the curriculum for undergraduate students were asked to forward our invitation to their students to participate in the research. The invitation was sent through the automated circular email systems of the universities and not by a direct, personal approach. To avoid non-authorized access,

the participants received a hyperlink and a password in the recruitment email to access the online questionnaire. Participants were asked to answer all questions if possible. To minimize missing data, if a question remained unanswered, an alert was sent by the system once, requesting to answer the omitted question.

In Hungary, at the Eötvös Loránd University 1075, the Budapest University of Technology and Economics 870 and the Corvinus University of Budapest, 900 students received a call to participate. In Spain, at the University of Almería 962, the University of Huelva 1119 and the University of Sevilla, 29 students were asked to participate in the research. Overall, 1588 people completed the questionnaire: in Hungary 1011 students (response rate 35.5%) and in Spain 577 students (response rate 27.3%). These response rates are comparable with other online surveys on drinking motives and alcohol use among university students (for a further discussion, see, for example, Kuntsche *et al*., 2008b).

Measures

Drinking motives

We used the DMQ-R SF (Kuntsche and Kuntsche, 2009). This short form measures drinking motives with 12 items; three per motive dimension. Participants were asked to indicate on a five-point relative frequency scale ranging from 'never/almost never' (coded as 1) to 'always/almost always' (coded as 5) how often they drink for any given motive item. For each language, the instrument was translated into Hungarian and Spanish by two independent researchers. Back translation was conducted to guarantee the quality of the translated versions.

Alcohol use

Alcohol use was measured by asking respondents to indicate the number of times they consumed alcohol and also the number of times they had got drunk in the last 30 days. The answer categories were 'not even once' (coded as 0), '1–3 times' (coded as 2), '4–9 times' (coded as 6.5), '10–19 times' (coded as 14.5), 'not every day, but at least 20 times, or more' (coded as 25) and 'every day' (coded as 30).

Alcohol-related problems

Alcohol-related problems were assessed by the 23-item Rutgers Alcohol Problem Index (RAPI: White and Labouvie, 1989). Again, the Hungarian and Spanish translations of the RAPI were accomplished by the authors with the same procedure as described above. Respondents could indicate how many times certain things had happened to them within the last 3 years while they were drinking alcohol or because of their alcohol drinking (e.g. 'went to work or school high or drunk', 'felt physically or psychologically dependent on alcohol', 'wanted to stop drinking but could not'). Answer categories were 'none' (coded as 1), '1–2 times' (coded as 2), '3–5 times' (coded as 3), '>5 times' (coded as 4). Responses are added together across items to form a scale (White and Labouvie, 1989).

Statistical analysis

To test structural and measurement invariance between the Hungarian and Spanish groups, we carried out a series of confirmatory factor analyses following the procedure described by Kuntsche *et al*. (2008b). Four nested models with increasing constraints were estimated. First, the four-dimensional measurement model was estimated freely in the Hungarian and Spanish samples. In this stage, factors were allowed to freely correlate. Secondly, the factor loadings and intercepts were set as equal between the countries. Thirdly, the factor variances, and fourthly, the correlations, between the four factors were set as equal.

To test the cultural differences in drinking motives, we performed a multiple indicators multiple causes (MIMIC) modeling (Brown, 2006) with the culture (Hungarian and Spanish) as a causal variable. MIMIC modeling was chosen for the present study because it can estimate the effect of indicators on latent variables and the direct effects of grouping variables at the same time, while other variables are controlled for (Brown, 2006).

To determine differences or similarities in the link between alcohol motives and alcohol outcomes (e.g. drunkenness), a multi-group multivariate structural equation model (SEM) was estimated. Enhancement, coping, social and conformity motives were treated as independent latent variables, and the alcohol use indicators were the dependent variables; gender and age were controlled in all analyses (see Kuntsche *et al*., 2006a for a similar model). We performed SEM with maximum likelihood parameter estimates with standard errors and χ^2 test statistics that were robust to non-normality and non-independence of observation (Muthén and Muthén, 1998–2007). The indicators of the frequency of drinking and drunkenness were log-transformed to approximate a normal distribution (Tabachnik and Fidell, 2001). All descriptive statistics of the alcohol use variables are calculated prior to log-transformation.

In the confirmatory factor analysis (CFA) and SEM analyses, beside χ^2 values, we applied four fit indices including the comparative fit index confirmatory factor analysis (CFI), the Tucker Lewis index (TLI), the root mean square error approximation (RMSEA) and the standardized root mean square residual (SRMR). The satisfactory degree of fit required the CFI to be close to 0.95; the second fit index was the TLI which was acceptable around 0.90; and the third fit index was RMSEA which indicated excellent fit if its value was <0.05 (Brown, 2006). The value of RMSEA around 0.08 indicated adequate fit, and a value >0.10 signified poor fit (Brown, 2006). The SRMR implied a good fit if its value was <0.08 (Brown, 2006).

Descriptive analyses were performed using the SPSS 15.0 statistical software package (SPSS, 2006). SEM analyses were performed with Mplus 5.2.

RESULTS

Sample description

Since motives can only be assessed among drinkers, among the 1588 respondents, 41 (24 Spanish and 17 Hungarian participants; 2.6% in total) were excluded from the analyses because they had not consumed any alcohol in the last 12

months. This resulted in a total sample of 1547 participants composed of 997 Hungarian and 550 Spanish students. The rate of gender was similar across the two samples: 37.4% Hungarian males and 36.7% Spanish males (Table 1). The mean age of the Spanish students were slightly older (22.7 years, SD = 3.18) than the Hungarians (mean age 22.4, SD = 2.69). Owing to the method of data collection, we detected no missing values.

Table 1. Differences in sample characteristics and characteristics of alcohol use among Spanish and Hungarian college students

	Spain	Hungary	Statistics
Sample size	550	997	
Mean age (SD)	22.72 (3.18)	22.39 (2.69)	$t = 2.07$*
Gender (% of boys)	36.7	37.4	$\chi^2 = 0.079$
Alcohol use in the past 30 days			
Less than weekly (maximum 3 times)	64.2%	50.7%	$\chi^2 = 26.41$***
Weekly or more frequent	35.8%	49.3%	
Drunkenness in the past 30 days			
Not even once	61.5%	53.8%	$\chi^2 = 8.49$**
Once or more times	38.5%	46.2%	
RAPI mean (SD)	7.74 (9.93)	8.41 (9.61)	$t = 1.38$

Though alcohol use data were treated as continuous variables in the regression analyses, for an easier review answer categories are dichotomized in this table.
*$P < 0.05$.
**$P < 0.01$.
***$P < 0.001$.

Table 2. Internal consistencies, means and SD's of the drinking motives measured by DMQ-R SF in the Spanish and Hungarian sample

	Spain ($n = 550$)	Hungary ($n = 997$)	Cohen-d
Internal consistency (Cronbach's α)			
Social	0.86	0.89	
Enhancement	0.70	0.75	
Coping	0.86	0.78	
Conformity	0.70	0.73	
Motive dimension means (SD)			
Social	2.40 (1.14)a	2.87 (1.14)b	0.41
Enhancement	1.88 (0.97)a	2.03 (0.89)b	0.16
Coping	1.45 (0.65)a	1.70 (0.83)b	0.33
Conformity	1.29 (0.58)a	1.34 (0.55)a	0.09
Gender, mean[a] (SD)			
Boys/men	1.88 (0.70)b	2.03 (0.67)a	0.23
Girls/women	1.69 (0.60)b	1.96 (0.66)a	0.42

[a]The simple average of all motive dimensions; post hoc test for group differences (*t*-test, significant at the 5% error level). Parameter means in each row that share subscripts (a or b) do not differ significantly.

Alcohol use, drunkenness and alcohol-related problems

Hungarian students were characterized by a higher drinking frequency, more frequent drunkenness events and a higher prevalence of alcohol-related problems. In the last month, almost half of the Hungarian respondents (49.3%), while only slightly more than one-third of the Spanish respondents (35.8%), indicated alcohol use at least weekly or more frequently. Drunkenness in the last month and also in the last year was more frequent among Hungarians. In addition, RAPI scores indicating the level of problem drinking were higher in the Hungarian (8.41) than in the Spanish sample (7.74; Table 1).

Drinking motives

In both countries, the internal consistencies of all drinking motive scales were 0.7 or higher (Table 2). The rank order of the motives showed no difference according to nationality. Students endorsed social motives most, followed by enhancement, coping and conformity motives in both countries (Table 2). Nevertheless, Hungarian students had higher mean levels in enhancement, social and coping motives than Spanish students.

Confirmatory factor analysis

We performed a series of confirmatory factor analyses to test the measurement invariance across countries. In the first step, we estimated model fit separately in both Hungarian and Spanish samples. We observed adequate fit in both groups: Hungarian: $\chi^2_{\text{Hungarian}} = 152.0$, df = 48; CFI = 0.970, TLI = 0.959; RMSEA 0.047 [0.038–0.055], SRMR = 0.035; Spanish: $\chi^2_{\text{Spanish}} = 150.4$, df = 48; CFI = 0.944, TLI = 0.923; RMSEA 0.062 [0.051–0.074], SRMR = 0.073.

In the multi-group analysis with Hungarian and Spanish samples, we estimated four nested models. The fit indices are presented in Table 3. The first one was the measurement model with freely estimated factor loadings and intercepts. In the second model, we constrained the intercepts and factor loadings to be equal in both groups. In the third model, we went further and put the equality constraints on factor variances. And finally in the fourth model, we added the further equality constraints on factor covariances. As presented in Table 3, the results of the multi-group CFA revealed an adequate fit of the model in which factor loadings were allowed to vary across countries. When the factor loadings were constrained to be equal between the Hungarian and Spanish groups, the model fit decreased significantly (Satorra–Bentler scaled χ^2 difference test = 365.1, df = 8, $P < 0.001$), but the fit indices remained in the acceptable range. The degree of

Table 3. Multi-group analysis of DMQ short version with four nested models

	$\chi^2_{\text{Hungarian}}$	χ^2_{Spanish}	df	CFI	TLI	RMSEA	95% CI RMSEA	SRMR
1. Unconstrained model	143.6	158.8	96	0.960	0.945	0.053	0.046–0.059	0.052
2. Intercepts and factor loadings are constrained	255.0	310.3	104	0.911	0.887	0.076	0.070–0.082	0.079
3. Intercepts, factor loadings and factor variances are constrained	251.7	438.6	116	0.889	0.874	0.080	0.074–0.086	0.092
4. Intercepts, factor loadings, factor variances and factor covariances are constrained	256.0	456.8	122	0.886	0.877	0.079	0.074–0.085	0.093

These analyses include only the measurement models with increasing constrains, there is not any adjustment for the age difference between groups. Lower χ^2 value, higher CFI, TLI and lower RMSEA and SRMR levels indicate a better model fit.

model fit decreased further significantly when the factor variances were fixed (Satorra–Bentler scaled χ^2 difference test = 58.5, df = 12, $P < 0.001$). Subsequently, when the correlations between the factors were fixed between the Hungarian and Spanish groups, the model fit decreased significantly again (Satorra–Bentler scaled χ^2 difference test = 14.7, df = 6, $P < 0.03$).

Although the strict assumptions of metric invariance were not met in terms of χ^2 comparisons (this level of equivalence is seldom achieved in non-randomly constituted groups such as countries; Horn *et al*., 1983), the contents of each of the latent variables suggest that the four scales assess psychologically similar constructs in Hungarian and Spanish samples. Thus, the four-dimensional factor structure of the DMQ-R appears suitable for cross-country comparisons.

MIMIC analysis

Because the Hungarian and Spanish groups differ slightly in age and gender distributions (Table 1), we applied a MIMIC analysis to test the association between the drinking motives and cultures (Hungarian and Spanish) while gender (male vs. female) and age are controlled. Degree of model fit was acceptable ($\chi^2 = 481.6$, df = 72; CFI = 0.931, TLI = 0.902; RMSEA 0.061 [0.056–0.066], SRMR = 0.043). The significant difference between cultures in social, enhancement and coping motives could be decoded from the significant path coefficients between cultures and drinking motives, while gender and age were controlled. Gender was significantly associated with social and enhancement motives, while culture and age were controlled. Finally, age was negatively associated with social and coping motives, while gender and culture were controlled for (Table 4).

Table 4. The impact of culture, gender and age on drinking motives from the MIMIC model: standardized coefficients

	Cultures	Gender	Age
Social	–0.20***	–0.13***	–0.07*
Enhancement	–0.11***	–0.12***	–0.04
Coping	–0.16***	–0.02	–0.08**
Conformity	–0.04	–0.07*	–0.04

Culture is coded 0 for Hungarians and 1 for Spanish. Gender is coded 0 for males and 1 for females.
*$P < 0.05$.
**$P < 0.01$.
***$P < 0.001$.

Associations between drinking motives and alcohol use indicators

The correlations between drinking motives as latent variables and frequency of alcohol use, drunkenness and RAPI scores are presented in Table 5. The patterns of correlations were similar in both groups. Not only did the social, enhancement, coping and conformity motives correlate significantly with alcohol use indicators, but the strength of correlations were also considerable.

In the further stage, two multivariate SEM analyses were performed in both groups separately. There was an adequate fit of the models in which paths between drinking motives and the different alcohol-related criterion measures were freely estimated in both groups ($\chi^2_{\text{Hungarian}} = 262.8$, df = 88; CFI = 0.963, TLI = 0.943; RMSEA = 0.045 [0.038–0.051], SRMR = 0.032; $\chi^2_{\text{Spanish}} = 233.5$, df = 88; CFI = 0.944, TLI = 0.914; RMSEA = 0.055 [0.046–0.063], SRMR = 0.059).

The results from the multivariate analyses presented in Table 6 revealed that enhancement motives were associated with the frequency of alcohol use and drunkenness in both Hungarian and Spanish groups. Coping motives were associated with alcohol-related problems (RAPI scores) in both groups. Moreover, alcohol problems were also associated with enhancement motives among Spanish students. Altogether, drinking motives explained almost half of the alcohol-related problems (43.8%) in the Spanish sample. Social motives did not have any significant link to alcohol-related outcomes. However, conformity motives had a negative relationship with frequency of alcohol use in both groups. Conformity motives correlated with frequency of alcohol use positively in Hungarian sample and did not correlate in Spanish sample

Table 5. Estimated correlations between drinking motives as latent variables and alcohol use, drunkenness and risky drinking in the Spanish and Hungarian sample

	Correlations with alcohol use indicators			Inter-correlations of drinking motives		
	Frequency	Drunkenness	RAPI	Social	Enhancement	Coping
Spain ($n = 550$)						
Social	0.28**	0.32**	0.55**			
Enhancement	0.42**	0.43**	0.63**	0.84**		
Coping	0.18**	0.27**	0.51**	0.47**	0.48**	
Conformity	0.06	0.14**	0.48**	0.57**	0.45**	0.56**
Gender	–0.14**	–0.23**	–0.10*			
Age	–0.01	0.05	–0.09			
Hungary ($n = 997$)						
Social	0.29**	0.32**	0.41**			
Enhancement	0.36**	0.37**	0.51**	0.88**		
Coping	0.24**	0.22**	0.52**	0.39**	0.63**	
Conformity	0.08**	0.13**	0.25**	0.57**	0.44**	0.29**
Gender	–0.10**	–0.06*	0.01			
Age	–0.07*	–0.06*	0.02			

Gender is coded 0 for males and 1 for females.
*$P < 0.05$.
**$P < 0.01$.

Table 6. Drinking motives as explanatory variables of alcohol use, drunkenness and risky drinking in the Spanish and Hungarian sample (standardized regression coefficients from freely estimated models, standard errors)

	Frequency			Drunkenness			Alcohol-related problems		
Variable	Stand. coef.	SE	*P*-value	Stand. coef.	SE	*P*-value	Stand. coef.	SE	*P*-value
Spain ($n = 550$)									
Social	–0.05	0.14	0.742	–0.02	0.17	0.896	0.01	0.16	0.936
Enhancement	**0.50**	**0.14**	**0.001**	**0.46**	**0.16**	**0.005**	**0.41**	**0.15**	**0.006**
Coping	0.11	0.07	0.132	0.12	0.10	0.210	**0.23**	**0.07**	**0.001**
Conformity	**–0.12**	**0.06**	**0.029**	–0.11	0.07	0.124	0.16	0.11	0.16
(R^2)	20.7%			21.7%			43.2%		
Hungary ($n = 997$)									
Social	–0.10	0.17	0.573	–0.04	0.16	0.796	0.05	0.17	0.784
Enhancement	**0.50**	**0.22**	**0.021**	**0.45**	**0.21**	**0.035**	0.22	0.21	0.309
Coping	0.01	0.09	0.883	–0.01	0.09	0.940	**0.36**	**0.09**	**0.001**
Conformity	**–0.10**	**0.04**	**0.017**	0.03	0.05	0.473	0.03	0.04	0.649
(R^2)	15.7%			16.0%			32.2%		

All models were adjusted for gender and age effects; R^2 does not contain gender and age effects.

(Table 5), and so we can conclude that the anomalous negative regression coefficients from conformity motives to the frequency of alcohol use in the multivariate analyses could be regarded as examples of negative suppressor effects due to the covariance between conformity motives and other motives (Lancaster, 1999; Tu *et al.*, 2008).

To compare the path coefficients in the Hungarian and Spanish groups, we also estimated one multi-group model in which all paths are estimated freely and the model fit was also adequate ($\chi^2_{total} = 495.6$, df = 176; $\chi^2_{Hungarian} = 256.7$; $\chi^2_{Spanish} = 238.9.4$; CFI = 0.956, TLI = 0.932; RMSEA 0.048 [0.043–0.054], SRMR = 0.043). In the next step, we constrained the path coefficients from each drinking motives factor to the alcohol use frequency indicator to be equal in both groups and tested the model fit ($\chi^2_{total} = 497.4$, df = 180; $\chi^2_{Spanish} = 240.2$; $\chi^2_{Spanish} = 240.2$; CFI = 0.956, TLI = 0.934; RMSEA 0.048 [0.043–0.053], SRMR = 0.044). The model fit did not worsen significantly (Satorra–Bentler scaled χ^2 difference test = 1.35, df = 4, $P > 0.05$), which therefore supports the assumption that the path coefficients from drinking motives to the alcohol use frequency indicator are not different in the Hungarian and Spanish groups.

In the following step, we constrained path coefficients from each drinking motives factor to the drunkenness indicator to be equal in both groups and tested the model fit ($\chi^2_{total} = 495.5$, df = 180; $\chi^2_{Hungarian} = 255.6$ $\chi^2_{Spanish} = 239.9$; CFI = 0.956, TLI = 0.934; RMSEA 0.048 [0.043–0.053], SRMR = 0.044). The model fit did not worsen significantly (Satorra–Bentler scaled χ^2 difference test = 0.0, df = 4, $P > 0.05$), which supports the assumption that the path coefficients from drinking motives to the drunkenness indicator are not different in the Hungarian and Spanish groups.

Finally, we constrained the same path coefficients from each drinking motives factor to the alcohol-related problems indicator to be equal in both groups and tested the model fit ($\chi^2_{total} = 496.9$, df = 180; $\chi^2_{Hungarian} = 256.0$ $\chi^2_{Spanish} = 240.9$; CFI = 0.956, TLI = 0.934; RMSEA 0.048 [0.043–0.053], SRMR = 0.044). The model fit did not worsen significantly (Satorra–Bentler scaled χ^2 difference test = 0.6, df = 4, $P > 0.05$), which supports the assumption that the path coefficients from drinking motives to the alcohol-related problems indicator are not different in the two groups.

DISCUSSION

In this study, we selected two European countries, Spain and Hungary, which are characterized by different drinking patterns, to examine similarities and differences in the motivational background of alcohol use. Our results showed remarkable similarities in drinking motives and in their links to alcohol-related outcomes between Spain and Hungary. As for the first aim of the study, the four-factor model of drinking motives was equivalent across the two countries (Table 3), indicating that the model is valid in cross-cultural comparison. As a scale, the DMQ-R SF (Kuntsche and Kuntsche, 2009) demonstrated good measurement properties in assessing drinking motives in countries with very different drinking cultures. Regarding other similarities, the rank order of the motives was also equivalent in both samples: students most frequently endorsed social motives, followed by enhancement, coping and conformity motives, in that order. This is consistent with other cross-national studies using the four-dimensional model of drinking motives (e.g. Kuntsche *et al.*, 2008b) but adds evidence on two rather distinct drinking cultures in Europe.

According to the second aim, the relation between drinking motives and various indicators of alcohol use was tested. Consistent with earlier research (for example Cooper *et al.*, 1995; Kuntsche *et al.*, 2005; Németh *et al.*, 2011), enhancement motives were associated with the frequency of drinking and drunkenness, and alcohol-related problems were associated with coping motives in both countries.

Besides the overwhelming similarities in drinking motives between Spain and Hungary, a few differences were also revealed by our cross-national comparison. First, Hungarian students had a higher mean level in social, enhancement and coping motives. Prior research found that heavy drinkers indicate more motives than moderate drinkers (Montgomery *et al.*, 1993; Stewart and Power, 2002). Thus, in this respect

our findings underpin the differences in the characteristics of the Mediterranean and Eastern European drinking cultures and they might reflect the particularly worrying hazardous drinking style in Hungary in the general population (Global Status Report on Alcohol, 2004; Popova *et al*., 2007). Our results highlight that drinking to deal with pressure in academic life, workplace or private life (coping motives), to enjoy social gatherings (social motives) and to feel the effects of alcohol (enhancement motives) might be crucial reasons for the heavy drinking patterns of Hungarians. These aspects underline the need to target the improvement of stress management, coping-related social skills and emotional regulation in prevention programs.

Secondly, another difference was that unlike the Hungarian sample, among Spanish students a significant association was found between alcohol-related problems and enhancement motives. A possible explanation for this result is that Hungarians scored higher on enhancement motives and problem drinking (RAPI scores), suggesting that both are more common in Hungary than in Spain. Consequently, among Spanish drinkers enhancement drinking is less typical and therefore it might be an indicator of problematic drinking. However, it might also be the case that the group of Spanish problem drinkers is dominated not only by those who drink to cope with their difficulties (coping drinkers) but also by enhancement drinkers. This latter type of drinker might drink such considerable quantities to enhance the effects of alcohol and to have fun that it finally leads to problems. The Mediterranean drinking style is characterized by mainly meal-related, moderate wine consumption (Room and Mäkele, 2000). Alcohol is predominantly consumed to make social gatherings more fun (social motives) and not to get high 'enhancement motives'. Consequently, the enhancement motive is not the typical drive of drinking and those who drink for enhancement motives might have a higher prevalence of alcohol-related problems.

However, this finding by itself does not imply a higher prevalence of alcohol-related problems among young Spanish adults; however, it points out the vulnerability of Spanish enhancement drinkers. A study by Calafat *et al.* (2005) confirms the assumptions that the traditionally moderate Mediterranean drinking style is no longer protective and is fundamentally changing. The authors investigated the relatively new phenomenon in Spain called 'botellon', which describes binge drinking activities of young people in large peer groups in open places. According to the study in Galicia, 40% of the population between 14 and 24 years has been to a botellon at some time (Calafat *et al*., 2005). Further studies should confirm whether Spanish enhancement drinkers are particularly prone to risky and problem drinking in botellons. We can hypothesize that drinking in high-risk situations (e.g. in parks, so avoiding certain controls in clubs and bars, such as age limit) might increase alcohol consumption (e.g. to enhance fun and excitement) and also it can lead to more alcohol-related problems such as accidents, unprotected sex, etc.

Nevertheless, we have to be cautious about making causal explanations of these findings. We used cross-sectional data which render the assessment of causal relationships impossible. A further limitation was that self-reported data were prone to memory bias, which might increase when the reference period is longer. A psychometric limitation of this study was the relatively large correlations between drinking motives which increased the impact of suppressor effects in multivariate analyses (Tu *et al*., 2008). Another limitation of the study is that our samples cannot necessarily be considered as representative of all university students in the two countries, due to the sampling frame of including three universities per country and to differences in the response rate. However, among the strengths of the study is the fact that it was set up as a cross-cultural study and that every action was taken to guarantee a cross-national comparison from the beginning, which was not the case in some of the previous studies (e.g. Kuntsche *et al*., 2008b). This procedure enabled us to make strict comparisons between drinking motives in two countries having very different drinking cultures and to offer possible explanations regarding the background of alcohol consumption.

Taken together, despite the substantial differences in the drinking culture of both countries, this cross-national comparison showed striking similarities and only a few differences in drinking motives between Spain and Hungary. The importance of drinking motives (such as indicated by the rank order of motives), and the significant relationship between enhancement motives, frequency of drinking and drunkenness and between coping motives and alcohol-related problems were invariant across cultures. Thus, our findings do not indicate such great diversities as have been reported about drinking motives in cultures from different continents (Gire, 2002; Nagoshi *et al*., 1994). It seems that even if Europe is characterized by major cross-cultural differences in alcohol use (Anderson and Baumberg, 2006), personal drinking motives and their impact on alcohol outcomes seem to be rather stable.

The evidence presented here might have a notable implication for prevention activities in the two cultures. As drinking motives have been found to be the most proximal factors for drinking (Cooper *et al*., 1995; Kuntsche *et al*., 2007; Urbán *et al*., 2008) and these factors are more easily accessible for prevention efforts than distal ones, prevention programs should take into consideration the motivational background of drinking. Evidence shows that prevention programs to reduce alcohol misuse should be built on personality risk factors which are associated with maladaptive drinking motives (e.g. enhancement and coping motives; Conrod *et al*., 2006). Coping and enhancement drinkers should be targeted with distinct prevention programs that take into account their specific needs and problems (Kuntsche *et al*., 2010). Coping drinkers should be addressed by programs reducing levels of stress, providing alternative ways of coping and enhancing self-esteem and competencies through life skills training (e.g. Botvin, 2000; Cooper *et al*., 1995). In contrast, enhancement drinkers need alternative sources of stimulation (Correia, 2004) or altering expectancies of the enhancing effects of alcohol (Cooper *et al*., 1995). Since enhancement drinkers typically drink in public places or social gatherings (Kuntsche *et al*., 2010), policies promoting safer drinking environments (e.g. Jones *et al*., 2010 for review) could be particularly effective for them. Given the valid and stable structure of alcohol motives in cross-cultural comparison confirmed by this study, the implementation of such policies and programs in different drinking cultures in Europe could be successful.

Acknowledgements — The authors thank Ákos Bontovics for his technical assistance. Z.D. acknowledges the financial support of the János Bolyai Research Fellowship awarded by the Hungarian Academy of Sciences.

Funding — This work was supported by the Hungarian Ministry of Labor and Social Affairs (KAB-KT-09-0010). The European Union and the European Social Fund have provided financial support to the project under the grant agreement no. TÁMOP 4.2.1./B-09/1/KMR-2010-0003.

REFERENCES

Alvarez FJ, del Rio MC. (1994) Gender differences in patterns of alcohol consumption in Spain. *Alcohol Clin Exp Res* **18**:1342–7.

Anderson P, Baumberg B. (2006) *Alcohol in Europe. A Public Health Perspective*. UK: Institute of Alcohol Studies.

Babor T, Caetano R, Casswell S *et al*. (2004) *Alcohol: No Ordinary Commodity. Research and Policy*. Oxford: Oxford University Press.

Botvin GJ. (2000) Preventing drug abuse in schools: social and competence enhancement approaches targeting individual-level etiologic factors. *Addict Behav* **25**:887–97.

Brown TA. (2006) *Confirmatory Factor Analysis for Applied Research*. New York: The Guilford Press.

Calafat A, Juan M, Becona E *et al*. (2005) El consumo de alcohol en la lógica del botellón. [The consumption of alcohol in the logic of the botellon.]. *Addicciones* **17**:193–202.

Carpenter KM, Hasin DS. (1998) Reasons for drinking alcohol: relationships with DSM-IV alcohol diagnoses and alcohol consumption in a Community Sample. *Psychol Addict Behav* **12**:168–84.

Catanzaro SJ, Laurent J. (2004) Perceived family support, negative mood regulation expectancies, coping, and adolescent alcohol use: evidence of mediation and moderation effects. *Addict Behav* **29**:1779–97.

Conrod PJ, Stewart SH, Comeau N *et al*. (2006) Efficacy of cognitive–behavioral interventions targeting personality risk factors for youth alcohol misuse. *J Clin Child Adolesc Psychol* **35**:550–63.

Cooper ML. (1994) Motivations for alcohol use among adolescents: development and validation of a four-factor-model. *Psychol Assess* **6**:117–28.

Cooper ML, Frone MR, Russell MA *et al*. (1995) Drinking to regulate positive and negative emotions: a motivational model of alcohol use. *J Pers Soc Psychol* **69**:990–1005.

Cooper ML, Kuntsche E, Levitt A *et al*. (2010) Motivational perspectives on substance use: a review of theory and research. In Sher KJ (ed). *Oxford Handbook of Substance Use Disorders*. New York, NY: Oxford University Press.

Correia CJ. (2004). Behavioral economics: basic concepts and clinical applications. In Cox WM, Klinger E (eds). *Handbook of Motivational Counseling*. Chichester: Wiley, 49–64.

Cox WM, Klinger E. (1988) A motivational model of alcohol use. *J Abnorm Psychol* **97**:168–80.

Cox WM, Klinger E. (1990) Incentive motivation, affective change, and alcohol use: a model. In Cox WM (ed). *Why people drink—Parameters of Alcohol as a Reinforcer*. New York, NY: Gardner Press, 291–314.

Currie C, Nic Gabhainn S, Godeau E *et al*. (eds.) (2006) HBSC international report from the 2005/2006 survey. Inequalities in young people's health. http://www.euro.who.int/InformationSources/Publications/Catalogue/20080616_1 (Downloaded: 12 May 2010).

European Health for All Database. (2008). WHO Regional Office for Europe, Copenhagen, Denmark (downloaded on 17 December 2010).

Gazso F, Stumpf I. (eds.) (1992) *Youth and Change of Regime*. Budapest: Institute for Political Science.

Gire JT. (2002) A cross-national study of motives for drinking alcohol. *Subst Use Misuse* **37**:215–33.

Global Status Report on Alcohol. (2004) World Health Organization, Geneva.

Hofstede G. (2001) *Culture's Consequences, Comparing Values, Behaviors, Institutions, and Organizations across Nations*. Thousand Oaks, CA: Sage Publications.

Horn JL, Mcardle JJ, Mason R. (1983) When is invariance not invariant: a practical scientist's look at the ethereal concept of factor invariance. *Southern Psychologist* **1**:179–88.

Jones L, Atkinson A, Hughes K *et al*. (2010) *Reducing Harm in Drinking Environments. A Systematic Review of Effective Approaches*. Centre for Public Health, Liverpool John Moores University, Liverpool, UK. http://www.stap.nl/content/bestanden/literature-study- drinking-environments_1.pdf (downloaded on 22 December 2010).

Kopp M, Réthelyi J. (2004) Where psychology meets physiology: chronic stress and premature mortality—the Central-Eastern European health paradox. *Brain Res Bull* **62**:351–67.

Kuntsche E. (2007) *Tell me … Why Do You Drink? A Study of Drinking Motives in Adolescence*. Lausanne: SFA-ISPA Press.

Kuntsche E, Kuntsche S. (2009) Development and validation of the Drinking Motive Questionnaire Revised Short Form (DMQ-R SF). *J Clin Child Adolesc Psychol* **38**:899–908.

Kuntsche E, Knibbe R, Gmel G *et al*. (2005) Why do young people drink? A review of drinking motives. *Clin Psychol Rev* **25**:841–61.

Kuntsche E, Knibbe R, Gmel G *et al*. (2006a) Replication and validation of the Drinking Motive Questionnaire Revised (DMQ-R, Cooper, 1994) among Adolescents in Switzerland. *Eur Addict Res* **12**:161–8.

Kuntsche E, Knibbe R, Gmel G *et al*. (2006b) Who drinks why? A review of socio-demographic, personality and contextual issues behind the drinking motives in young people. *Addict Behav* **31**:1844–57.

Kuntsche E, Knibbe R, Engels R *et al*. (2007) Drinking motives as mediators of the link between alcohol expectancies and alcohol use among adolescents. *J Stud Alcohol Drugs* **68**:76–85.

Kuntsche E, Stewart SH, Cooper ML. (2008a) How stable is the motive-alcohol use link? A cross-national validation of the Drinking Motives Questionnaire Revised among adolescents from Switzerland, Canada and the United States? *J Stud Alcohol Drugs* **69**:388–96.

Kuntsche E, Von Fischer M, Gmel G. (2008b) Personality factors and alcohol use: a mediator analysis of drinking motives. *Pers Individ Dif* **45**:796–800.

Kuntsche E, Knibbe R, Engels R *et al*. (2010) Being drunk to have fun or to forget problems? Identifying enhancement and coping drinkers among risky drinking adolescents. *Eur J Psychol Assess* **26**:46–54.

Kuntsche E, Kuntsche S, Knibbe R *et al*. (2011) Cultural and gender convergence in adolescent drunkenness: evidence from 23 European and North American countries. *Arch Pediatr Adolesc Med* **165**:152–8.

Lancaster BP. (1999, January). Defining and interpreting suppressor effects: advantages and limitations. In: Paper presented at the Annual Meeting of the Southwest Educational Research Association. San Antonio, TX.

Montgomery RL, Benedicto JA, Haemmerlie FM. (1993) Personal vs social motivations of undergraduates for using alcohol. *Psychol Rep* **73**:960–2.

Muthén LK, Muthén BO. (1998–2007) *Mplus: User's Guide*. 5th edn. Los Angeles, CA: Muthén Muthén.

Nagoshi CT, Nakata T, Sasano K *et al*. (1994) Alcohol norms, expectancies, and reasons for drinking and alcohol use in a U.S. versus a Japanese college sample. *Alcohol Clin Exp Res* **18**:671–8.

Németh Z, Kuntsche E, Urbán R, Farkas J, Demetrovics Z. (2011) Why do festival goers drink? Assessment of drinking motives. *Drug Alcohol Rev* **30**:40–46.

Piko BF, Wills TA, Walker C. (2007) Motives for smoking and drinking: country and gender differences in samples of Hungarian and US high school students. *Addict Behav* **32**:2087–98.

Popova S, Rehm J, Patra J *et al*. (2007) Comparing alcohol consumption in Central and Eastern Europe to other European countries. *Alcohol Alcohol* **42**:465–73.

Rehm J, Room R, Monteiro MG *et al*. (2003a) Alcohol as a risk factor for global burden of disease. *Eur Addict Res* **9**:157–64.

Rehm J, Rehn N, Room R *et al*. (2003b) The global distribution of average volume of alcohol consumption and patterns of drinking. *Eur Addict Res* **9**:147–56.
Rehm J, Taylor B, Patra J. (2006) Volume of alcohol consumption, patterns of drinking and burden of disease in the European region 2002. *Addiction* **101**:1086–95.
Room R. (1992) The impossible dream? Routes to reducing alcohol problems in a temperance culture. *J Subst Abuse* **4**: 91–106.
Room R, Mäkele K. (2000) Typologies of the cultural position of drinking. *J Stud Alcohol* **61**:475–83.
Simons-Morton B, Farhat T, ter Bogt T *et al*. (2009) Gender specific trends in alcohol use: cross-cultural comparisons from 1998 to 2006 in 24 countries and regions. *Int J Public Health* **54**:199–208.
SPSS. (2006) *SPSS Base 15.0 User's Guide*. Chicago, IL: SPSS Inc.
Stewart C, Power TG. (2002) Identifying patterns of adolescent drinking: a tri-ethnic study. *J Stud Alcohol* **63**:156–68.
Tabachnick BG, Fidell LS. (2001) *Using Multivariate Statistics*. 4th edn. Needham Heights, MA: Allyn Bacon.
Tu Y-K, Gunnell D, Gilthorpe MS. (2008). Simpson' s Paradox, Lord' s Paradox, and Suppression Effects are the same phenomenon—the reversal paradox. *Emerg Themes Epidemiol* **5**:1–9.
Urbán R, Kökönyei G, Demetrovics Z. (2008) Alcohol outcome expectancies and drinking motives mediate the association between sensation seeking and alcohol use among adolescents. *Addict Behav* **33**:1344–52.
White HR, Labouvie EW. (1989) Toward the assessment of adolescent problem drinking. *J Stud Alcohol* **50**:30–7.