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Drinking Motives Mediate Cultural Differences but Not Gender Differences in Adolescent Alcohol Use

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A B S T R A C T

Purpose: To test whether differences in alcohol use between boys and girls and between northern and southern/central Europe are mediated by social, enhancement, coping, and conformity motives.
Methods: Cross-sectional school-based surveys were conducted among 33,813 alcohol-using 11- to 19-year-olds from northern Europe (Denmark, Estonia, Finland, Ireland, Poland, Scotland, and Wales) and southern/central Europe (Belgium, Hungary, Italy, Portugal, Slovakia, and Switzerland).
Results: Particularly in late adolescence and early adulthood, boys drank more frequently and were more often drunk than girls. Instead of mediation, gender-specific motive paths were found; 14- to 16-year-old girls drank more because of higher levels of coping motives and lower levels of conformity motives, whereas 14- to 19-year-old boys drank more because of higher levels of social and enhancement motives. Geographical analyses confirmed that adolescents from southern/central European countries drank more frequently, but those from northern Europe reported being drunk more often. The strong indirect effects demonstrate that some of the cultural differences in drinking are because of higher levels of social, enhancement, and coping motives in northern than in southern/central Europe.
Conclusions: The results from the largest drinking motive study conducted to date suggest that gender-specific prevention should take differences in the motivational pathways toward (heavy) drinking into account, that is, positive reinforcement seems to be more important for boys and

IMPLICATIONS AND CONTRIBUTION

To reduce underage drinking, the results from the largest drinking motive study conducted to date suggest targeting gender differences in the motivational pathways toward (heavy) drinking (positive reinforcement for boys and negative reinforcement for girls) and social and enhancement motives together with drinking circumstances in northern Europe.

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negative reinforcement for girls. Preventive action targeting social and enhancement motives and taking drinking circumstances into account could contribute to tackling underage drinking in northern Europe.

Despite declines in recent decades [1,2], gender differences remain one of the most reliable determinants of alcohol consumption; males drink and are drunk more frequently than females [3–5]. Given differences in the ratio of body water to body weight and alcohol metabolism, women are more susceptible to alcohol effects than men [5]. Interestingly, although gender differences in risky drinking are almost nonexistent in early adolescence, they become more and more pronounced later on [6,7]. For example, across 38 countries, repeated drunkenness prevalence increases with age, from 2% among 11-year-olds to 9% and 32% among 13- and 15-year-olds, respectively, and the gender gap also increases with age [8].

Although countries across Europe have become more similar in terms of drunkenness prevalence [2], drinking cultures differ between northern Europe, where excessive drinking on particular occasions is more socially acceptable, and southern European wine-producing countries, where the predominant drinking pattern is frequent consumption of moderate amounts of alcohol often accompanying meals [3,9,10]. For example, in countries such as Denmark, Wales, and Estonia, the prevalence of repeated drunkenness among 15-year-olds exceeded 45% compared with 20% or lower in countries such as Portugal and Italy [8]. Differences in alcohol policy and traditional drinking patterns in a culture might account for cross-national differences in drunkenness among young people [11,12].

However, the basic question emerges as to whether gender and drinking culture differences directly account for variations in drinking and drunkenness frequencies or whether the relationships reported previously are mediated by another variable, such as drinking motives. Drinking motives constitute a final pathway toward alcohol use [13,14], that is, the gateway through which more distal factors are mediated such as alcohol expectancies [15], genetic factors [16], and personality characteristics [17,18], to name but a few. Drinking motives can be classified by the kind of reinforcement individuals like to obtain (positive vs. negative) in relation to either the psychoactive effects of alcohol (internal) or instrumental social effects (external). This results in four distinct categories [19]: enhancement (internal positive, e.g., drinking to have fun); coping (internal negative, e.g., drinking to forget problems); social (external positive, e.g., drinking to be sociable); and conformity (external negative, e.g., drinking to fit in with a group).

Previous research has shown that social motives are related to frequent drinking, whereas enhancement and coping motives are related to frequent drunkenness [14,20]. Boys tend to report social, enhancement, and conformity motives more frequently, and coping motives less frequently, compared with girls [20,21]. These gender differences are more marked among older adolescents [22]. For example, Cooper [19] found no gender differences at the age of 13 and 14 years but a stronger increase in social and enhancement motives among boys in subsequent years. Unfortunately, the limited available evidence originates mostly from North America or from individual European countries [23].

This study is based on a large cross-national survey of 13 European countries covering the broad age range from early to late adolescence. In a previous article [23], we confirmed the four-dimensional factor structure and the hierarchy of mean levels of drinking motives and their links to alcohol use across countries. In this article, we focus on gender differences. We expect higher levels of social, enhancement, and conformity motives and lower levels of coping motives among boys than among girls [20,21]. This should be particularly the case among older adolescents [19]. Subsequently, we test whether the four drinking motive dimensions mediate the link between gender and alcohol use. We expect that the higher levels of social and enhancement motives among boys account for the higher frequencies of drinking and drunkenness. An exception to this mediation is anticipated among younger adolescents because of the lack of gender difference in alcohol use previously reported [6,7]. Furthermore, this study investigates whether adolescents from countries in northern Europe differ in their drinking motivations from those in southern/central European countries, testing whether the link between drinking culture (northern vs. southern/central Europe) and alcohol use is mediated by drinking motives.

Methods

Study design

Most data used in this study are from the "Health Behaviour in School-aged Children" (HBSC.org) study [8]. Of the 43 countries and regions participating in this World Health Organization (Europe) collaborative project, 11 included the "Drinking Motive Questionnaire Revised Short Form" (DMQ-R SF [20]) in their 2009/10 survey. The Hungarian and Italian data were collected independently from Health Behaviour in School-aged Children but also using a random cluster-sampling procedure with school classes serving as primary sampling unit. All data were collected between autumn 2008 and spring 2010. In each country, nationally representative surveys were conducted; exceptions where regionally representative samples were collected were Belgium (Flanders region), Hungary (Budapest region), and Italy (Veneto region) [23].

Teachers or members of the research team distributed anonymous self-report questionnaires in the classroom. Students were instructed that participation was completely voluntary. In each country, the study was approved by the appropriate university or governmental ethics review board. The average response rate was 71% with 60% or higher for all countries except Denmark (46%) and Belgium (29%) (mainly because of an elevated refusal rate on school level and not because of a low participation rate at an individual level [8]).

Sample

Participants with missing values for gender or age (about 1.1% in total, ranging from 0% in Belgium, Portugal, and Scotland to

8.4% in Denmark) had been excluded at country level. The merged data file comprises 62,138 boys and girls aged 11 to 19 years. Students who had not consumed alcohol in the previous 12 months (n = 27,797; 44.7%) were excluded from the sample as they could not answer the questions on drinking motives. Another 528 (.8%) cases were excluded because they had missing values in all three items of at least one of the four different motive dimensions. The remaining net sample used in the analyses consists of 33,813 students (for further details, see [23]), of whom 50.1% were boys. The age split was 18.1% in the 11- to 13-year age category, 60.6% in the 14- to 16-year category, and 21.3% in the 17- to 19-year category.

Measures

Drinking motives were assessed by the internationally validated DMQ-R SF [20,24,25]. In Belgium, Finland, Hungary, Portugal, Scotland, Slovakia, and Switzerland, the five-point scale from the original DMQ-R [19] was used, that is, "(almost) never" (1), "some of the time" (2), "about half of the time" (3), "most of the time" (4), and "(almost) always" (5). In Denmark, Estonia, Ireland, Italy, Poland, and Wales, a three-point version of the DMQ-R SF was used, and values were transformed to match those of the DMQ-R, that is, "(almost) never" (1), "about half of the time" (3), and "(almost) always" (5) (for further details, see [21,23]).

Sociodemographic variables. Gender was coded 0 for girls and 1 for boys. Year and month of birth were used to calculate participants' age.

Drinking culture. To investigate differences between non–wine-producing countries in those more northern parts of Europe and wine-producing countries in southern and central Europe [9], consistent with the classification of the United Nations Statistics Division [26] and a previous publication [23], half of the countries were classified as "Northern Europe" (Denmark, Estonia, Finland, Ireland, Poland, Scotland, and Wales, coded as 1) and half as non-northern, central, and southern countries mostly as "Southern Europe" (Belgium, Hungary, Italy, Portugal, Slovakia, and Switzerland, coded as 0).

Drinking frequency. Adolescents were asked "How often do you drink anything alcoholic, such as beer, wine, or spirits? Try to include even those times when you only drink a small amount." The response categories were "never," "less than once a month," "every month," "every week," and "everyday" and were recoded to provide annual frequency (e.g., "every week" was coded as 52) [23,27]. To create a drinking frequency measure, the most frequently consumed beverage (i.e., beer, wine, alcopops, or spirits) was taken. In Hungary, respondents were asked how often they had drunk in the past 30 days. Response categories ("0," "one to three times," "four to nine times," "10–19 times," "20–29 times," "everyday") were recoded into "never," "several times a month," "several times a week," and "(almost) everyday" to match those of the other countries. In Poland, drinking frequency was not assessed.

Drunkenness frequency. Adolescents were asked, "Have you ever had so much alcohol that you were really drunk?" with the response categories "no, never," "yes, once," "yes, two to three times," "yes, four to 10 times," and "yes, more than 10 times." Midpoints of categories were used, with 13 for the upper category (10 times plus the range to midpoint of adjacent category [23,27]). No corresponding question was included in Hungary and Italy.

Analytic strategy

Representing early, middle, and late adolescence [28], the analyses were conducted in the three age groups 11- to 13-year-olds, 14- to 16-year-olds, and 17- to 19-year-olds separately. This also enables a more thorough comparison of findings across countries in which not all age groups were sampled. First, to test for a necessary condition of partial mediation (i.e., that the mediator variables are associated with the predictors), drinking motives were regressed on gender and drinking culture. Second, to obtain the total effects, the frequencies of drinking and drunkenness were regressed on gender and drinking culture. Third, drinking motives were added to obtain the indirect effects (i.e., the paths via drinking motives) [29] and the remaining direct effects of gender and drinking culture on the frequencies of drinking and drunkenness (Figure 1). Estimated in Mplus 7 [30], the delta method was used to obtain standard errors and significance levels of the indirect effects (mediated paths). To account for the fact that not all age groups were included in every country, the models were estimated separately by age group. To further adjust for possible age effects, age was included as a confounder within the age groups.

Drinking frequency and drunkenness frequency were log transformed to approximate a normal distribution and reduce the impact of extreme values [31]. Using sandwich estimation and the maximum likelihood robust method, the non-normal distribution of alcohol outcomes and the cluster design effect of sampling schools or school classes were taken into account directly in Mplus [30]. Robustness and accuracy of the results were assured by re-estimating the model using (a) the ordered

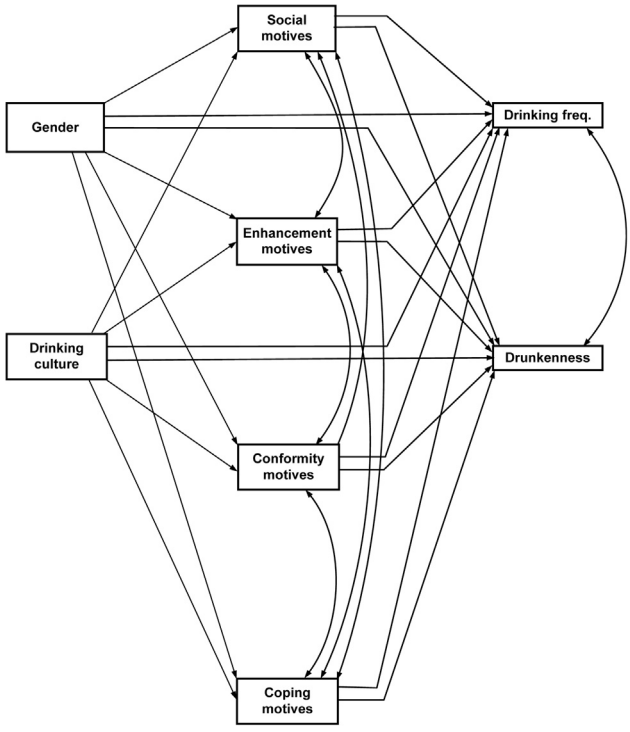

Figure 1. Graphical representation of the regression model. freq., frequency.

categorical option of Mplus for the dependent variables and (b) bootstrap resampling with 500 random draws [29]. However, in both cases, neither the direction of effects nor their significance level changed, which demonstrates the robustness of the findings across estimation methods (results not shown but can be obtained on request).

Results

Sample description

Although frequencies of drinking and drunkenness varied considerably across countries, a clear pattern emerged for all age groups (Table 1). Compared with southern Europe, adolescents from northern Europe reported drinking less frequently but reported more frequent drunkenness. Both the frequencies of drinking and drunkenness increased across the age groups. Among those who had drunk alcohol, the 11- to 13-year-olds reported, on average, drinking 25 times in the last year and having been drunk one and a half times in their lives. In the oldest group, the average frequencies of drinking and drunkenness were around twice as high and approaching four times higher, respectively.

Links between drinking motives and gender and drinking culture

There was no gender difference in drinking motives in the youngest age group except the higher level of conformity motives among boys (Table 2). Among the older age groups, boys were more likely to report social, enhancement, and conformity motives and girls coping motives, this latter finding statistically significant among 14- to 16-year-olds only. Gender differences increased considerably across the age categories for social and enhancement motives. For all motive dimensions in all age groups, adolescents from northern Europe reported drinking more frequently for all the drinking motives compared with their counterparts from southern European countries (Table 2).

Mediation of gender effects

In terms of the total effect, boys drank more frequently and were drunk more often than girls across all age groups (Table 3). The size of these gender differences increased across the age groups, that is, among 17- to 19-year-olds, the coefficient was more than three times higher than that for 11- to 13-year-olds.

In the youngest age group, the direct gender effect was slightly more pronounced than the total effect because of a negative total indirect effect. In other words, boys drank more often than girls for conformity motives, which are associated with lower frequencies of drinking and drunkenness. Otherwise, there was no mediation effect for gender in the youngest age group.

Among 14- to 16-year-olds, direct and total links between gender and alcohol use were similar. Although drinking motives mediated the effect of gender on alcohol to a limited extent only, this does not mean that there were no gender-specific indirect effects; rather, the positive indirect effects of social and enhancement motives (boys scored higher on social and enhancement motives) were compensated by the negative indirect effects of coping and conformity motives (girls scored higher on coping and lower on conformity motives that showed negative link with alcohol use).

In the oldest age group, compared with the 14- to 16-year-olds, the positive indirect effect of enhancement motives was stronger and the negative indirect effect of coping motives was weaker, resulting in a positive total indirect effect.

Table 1
Sample description

	11- to 13-year-olds			14- to 16-year-olds			17- to 19-year-olds		
	n[a]	Drinking frequency	Drunkenness frequency	n[a]	Drinking frequency	Drunkenness frequency	n[a]	Drinking frequency	Drunkenness frequency
		M (SD)	M (SD)		M (SD)	M (SD)		M (SD)	M (SD)
Gender									
Boys	3,101	28.98 (72.77)	1.40 (2.87)	10,233	38.77 (75.96)	3.67 (4.54)	3,037	68.60 (94.03)	5.76 (5.17)
Girls	3,000	19.92 (53.09)	1.28 (2.68)	10,227	23.64 (45.23)	3.15 (4.14)	2,994	40.72 (60.32)	3.71 (4.30)
Northern Europe[b]	3,029	22.04 (56.92)	1.60 (3.03)	11,275	26.29 (51.36)	4.07 (4.62)	1,854	30.97 (48.91)	5.16 (4.99)
Denmark	380	21.00 (55.92)	2.05 (3.36)	1,188	24.79 (45.13)	5.27 (4.93)	—	—	—
Estonia	627	20.02 (55.82)	1.80 (3.30)	1,468	24.52 (52.30)	3.91 (4.44)	—	—	—
Finland	—	—	—	1,305	16.12 (29.51)	5.00 (4.89)	—	—	—
Ireland	113	18.18 (49.05)	2.02 (3.55)	2,920	25.59 (58.37)	3.41 (4.32)	696	30.97 (48.91)	5.24 (4.95)
Poland	—	—	—	—	—	—	1,158	—	5.11 (5.02)
Scotland	—	—	—	1,697	31.20 (50.00)	4.56 (4.89)	—	—	—
Wales	1,909	23.14 (57.91)	1.41 (2.81)	2,697	30.51 (53.69)	3.57 (4.36)	—	—	—
Southern Europe[b]	3,086	26.96 (70.20)	1.08 (2.47)	9,224	37.22 (74.31)	2.49 (3.76)	5,345	57.85 (83.05)	4.26 (4.68)
Belgium	711	22.07 (62.75)	.92 (2.19)	2,136	35.50 (63.62)	2.52 (3.71)	1,442	48.48 (75.06)	4.26 (4.68)
Hungary	—	—	—	—	—	—	2,728	45.04 (52.43)	—
Italy	162	54.69 (104.92)	—	1,189	82.18 (119.24)	—	1,175	99.02 (126.04)	—
Portugal	365	9.59 (33.74)	.79 (2.05)	1,108	18.90 (50.46)	2.00 (3.34)	—	—	—
Slovakia	1,599	31.16 (76.58)	1.17 (2.62)	2,376	32.94 (68.68)	2.94 (4.10)	—	—	—
Switzerland	249	21.39 (47.49)	1.39 (2.71)	2,415	29.15 (58.86)	2.24 (3.58)	—	—	—
Total[b]	6,115	24.52 (64.01)	1.34 (2.78)	20,499	31.21 (62.97)	3.41 (4.35)	7,199	54.76 (80.32)	4.76 (4.88)

Drinking frequency represents number of occasions on which alcohol was consumed in the past year; drunkenness frequency represents number of times individuals have been drunk in their lifetime; — indicates not available.
M = mean; SD = standard deviation.
[a] Of those who consumed alcohol at least once and sufficient data on all four motive dimensions (see Methods section).
[b] Unweighted mean across countries, total for final sample size.

Table 2
Drinking motives regressed on gender and culture in the three age groups

	Social	Enhancement	Coping	Conformity
11- to 13-year-olds				
Gender	−.008^{ns} (−.58)	.004^{ns} (.31)	−.020^{ns} (−1.43)	.069 (5.00)
Drinking culture	.215 (15.29)	.077 (4.79)	.069 (4.20)	.063 (3.92)
14- to 16-year-olds				
Gender	.058 (8.09)	.040 (5.10)	−.051 (−6.18)	.107 (14.61)
Drinking culture	.286 (34.65)	.209 (21.85)	.116 (10.92)	.142 (16.05)
17- to 19-year-olds				
Gender	.174 (12.92)	.167 (11.12)	−.028^{ns} (−1.69)	.118 (9.01)
Drinking culture	.241 (14.31)	.094 (4.40)	.162 (8.01)	.088 (5.47)

Standardized regression coefficients are shown; adjusted for age effects within the three age groups; *t* values in brackets; gender: girls (0), boys (1); drinking culture: southern/central Europe (0), northern Europe (1); all regression coefficients are statistically significant at $p < .001$ except $^{ns}p \geq .05$.
ns = nonsignificant.

Mediation of cultural effects

Compared with the total effect, the direct effect of drinking culture on drinking frequency was negative (11- to 13-year-olds) or more strongly negative (14- to 19-year-olds), and the direct effects of drinking culture on drunkenness frequency were less positive (11- to 16-year-olds) or nonsignificant (17- to 19-year-olds) because of the significant positive indirect effect for both drinking and drunkenness frequencies (Table 3). In other words, the fact that those from the north drank less frequently than their counterparts from southern/central Europe was even more pronounced when differences in drinking motives were included. Cultural differences in drunkenness frequencies were mainly because of differences in drinking motives (indirect effects) attenuating direct effects of drinking culture on drunkenness frequency. Although the indirect effect of conformity motives was consistently negative for all age groups and both alcohol outcomes (because northern European adolescents scored higher on conformity motives and these were negatively related to drinking), it did not compensate for the strong positive indirect effects of social, enhancement, and coping motives.

Discussion

This study aimed to test whether drinking motives mediate the link between gender and drinking culture on alcohol use among 11- to 19-year-olds from 13 European countries. Consistent with previous research, the results revealed that boys drank more frequently and were drunk more often than girls and that these gender differences increased with age [6,7]. These findings might reflect differences in physical maturation, alcohol tolerance, metabolism, and socialization between boys and girls [5].

In the two younger age groups, these differences could not be explained by drinking motives. In the youngest age group, except for conformity, there was no significant difference in drinking motives between boys and girls. This is not only consistent with previous research on drinking motives [19,22] but also on alcohol use in general for which only after early adolescence gender differences were found to become increasingly pronounced [6,7]. Initiation into alcohol use often occurs within the family or due to family-related factors such as alcohol-specific rules and socialization or exposure to parental drinking [32]. Such family-related factors concern both genders. Moreover, girls usually

Table 3
Alcohol use regressed on gender, culture, and drinking motives in the three age groups

Age group, years	Drinking frequency			Drunkenness frequency		
	11–13	14–16	17–19	11–13	14–16	17–19
Total effect						
Gender	.057 (4.37)	.104 (10.2)	.193 (9.98)	.040** (2.79)	.054 (6.72)	.195 (10.57)
Drinking culture	.008^{ns} (.44)	−.071 (−4.17)	−.261 (−10.21)	.107 (7.06)	.166 (15.76)	.073 (3.59)
Explained var. (R^2), %	1.2	2.6	9.8	4.6	5.4	4.6
Direct effects						
Gender	.070 (5.63)	.102 (10.96)	.151 (9.65)	.056 (4.76)	.052 (7.65)	.130 (7.69)
Drinking culture	−.040* (−2.10)	−.172 (−10.32)	−.330 (−14.11)	.030* (2.18)	.035 (3.88)	−.016^{ns} (−.88)
SOC	.184 (10.39)	.215 (23.35)	.123 (7.97)	.282 (16.77)	.221 (25.33)	.211 (10.65)
ENH	.144 (7.58)	.150 (15.44)	.209 (11.72)	.218 (10.55)	.347 (37.00)	.304 (16.20)
COP	.104 (5.52)	.167 (17.68)	.165 (12.66)	.143 (7.78)	.147 (18.33)	.147 (9.34)
CNF	−.144 (−7.74)	−.078 (−7.90)	−.081 (−5.32)	−.169 (−9.88)	−.153 (−20.3)	−.160 (−11.13)
Indirect effects						
Gender						
Via SOC	−.001^{ns} (−.58)	.012 (7.60)	.021 (6.70)	−.002^{ns} (−.58)	.013 (7.73)	.037 (8.04)
Via ENH	.001^{ns} (.31)	.006 (4.71)	.035 (6.85)	.001^{ns} (.31)	.014 (5.05)	.051 (9.05)
Via COP	−.002^{ns} (−1.36)	−.009 (−5.70)	−.005^{ns} (−1.64)	−.003^{ns} (−1.39)	−.008 (−5.79)	−.004^{ns} (−1.67)
Via CNF	−.010 (−4.01)	−.008 (−7.00)	−.010 (−4.82)	−.012 (−4.51)	−.016 (−11.61)	−.019 (−7.18)
Total indirect	−.013** (−2.78)	.001^{ns} (.44)	.042 (5.72)	−.016* (−2.33)	.003^{ns} (.60)	.064 (7.29)
Drinking culture						
Via SOC	.040 (8.24)	.061 (19.95)	.030 (6.45)	.061 (10.69)	.063 (20.51)	.051 (7.98)
Via ENH	.011 (4.15)	.031 (13.04)	.020 (4.41)	.017 (4.36)	.073 (18.15)	.028 (4.38)
Via COP	.007 (3.21)	.019 (9.72)	.027 (7.45)	.010 (3.55)	.017 (9.41)	.024 (6.30)
Via CNF	−.009 (−3.72)	−.011 (−7.26)	−.007 (−3.79)	−.011 (−3.77)	−.022 (−13.01)	−.014 (−5.17)
Total indirect	.049 (8.44)	.101 (23.81)	.069 (8.86)	.077 (9.56)	.131 (24.81)	.011 (8.28)
Explained var. (R^2), %	10.4	17.9	24.1	26.1	34.6	28.7

Standardized regression coefficients are shown; adjusted for age effects within the three age groups; *t* values in brackets; gender: girls (0), boys (1); drinking culture: southern/central Europe (0), northern Europe (1); total indirect represents sum of the "via SOC," "via ENH," "via COP," and "via CNF" effect; all regression coefficients are statistically significant at $p < .001$ except $^{ns}p \geq .05$ $^{*}p < .05$ and $^{**}p < .01$.
COP = coping motives; CNF = conformity motives; ENH = enhancement motives; ns = nonsignificant; SOC = social motives; var. = variance.

start puberty earlier than boys, which also attenuates gender differences in early drinking [6].

Among 14- to 16-year-olds, the findings indicate gender-specific pathways toward alcohol use. Boys drank more because of their higher levels of social and enhancement motives, whereas girls drank more because of their higher levels of coping motives and their lower levels of conformity motives. Consistent with research on the link between personality factors and drinking motives [18,22], it appears that the use of alcohol for positive reinforcement is more common among boys who are more impulsive and sensation seeking than girls. By contrast, coping drinking seems more common among girls who tend to be more inhibited and anxiety sensitive than boys. Taking these indirect effects together, there is no overall motive mediation of gender effects on alcohol use among 14- to 16-year-olds. It is only in late adolescence and early adulthood that some of the gender difference in drinking appears to be mediated through higher levels of enhancement and social motives among men (including heavy drinking on weekend evenings with friends to seek fun, excitement, and other extreme sensations [33,34]) and the reduced importance of gender differences in coping motives at this age [22].

With regard to differences among adolescents from northern versus southern/central Europe, the total effects for drinking motives confirm previous research [3,9,10], showing that adolescents from southern European countries drink more frequently, but those from northern Europe were drunk more often. In addition, this study revealed that these cultural differences were relatively small in the younger age groups but become more pronounced over the adolescent years.

In all three age groups and for both alcohol use measures, there was a small but consistent positive indirect effect via drinking motives. It appears that adolescents from northern Europe do not drink less frequently than their counterparts from more southern countries because they would not be motivated to do so (in fact they score even higher on all motive dimensions) but seem to be influenced by structural or cultural circumstances. The stricter alcohol policies in northern Europe [11,12] and the traditional drinking culture in which alcohol is less of a part of everyday life [9,10] are likely to result in fewer opportunities to consume alcohol than those of their peers from southern European countries. Differences in drunkenness frequency can also be partly explained by higher levels of drinking motives among adolescents from northern Europe than among those from southern/central Europe. Interestingly, and in contrast to gender effects, the mediation of cultural effects was stronger among the two younger age groups (11- to 16-year-olds) and for social and enhancement motives than among the older group and for other motives. It would appear that drinking to maximize fun with friends at parties partly explains the difference in drunkenness frequencies of underage drinkers from northern and southern Europe.

One of the limitations is the low response rate of some countries (notably Belgium and Denmark) and the cross-sectional data that obviate causal conclusions. Moreover, future cross-cultural research should include alcohol measures in addition to the two that were available in this study. Although most countries included used a standardized research protocol (e.g., the same questionnaire and sampling procedure) and a back-translation process, the possibility of methodological differences cannot be ruled out. It is also worth noting that, as a proxy for cultural differences in alcohol use, only a selection of countries was used, of which some (e.g., Hungary and Italy) were only represented by regional samples and that not all age groups were included in all countries. To the best of our knowledge, however, both in terms of sample size and variety of countries included, this is the largest drinking motive study ever conducted. Having focused on Europe, it would be interesting to extend this cross-cultural comparative work to countries from other continents such as Latin America, Africa [35], and Asia [36].

Although gender differences in alcohol use were not consistently mediated by drinking motives, these may nevertheless be useful in gender-specific prevention approaches. The results confirm that boys and girls differed in their motivational pathways toward engagement in (heavy) drinking, that is, positive reinforcement (enhancement and social motives) seems to be more important for boys and negative reinforcement (particularly coping) more common among girls. The results also indicate that preventive action targeting social and enhancement motives could contribute to efforts to address underage drinking in northern Europe.

The authors argue that reducing levels of stress, providing alternative ways of coping, and enhancing self-esteem and competencies through life-skills training appear to be particularly promising strategies for coping drinkers [37,38]. On the other hand, the provision of alternative sources of stimulation [39] or altering expectancies of the enhancing effects of alcohol [38] would better suit the needs of enhancement drinkers. Because their heavy drinking appears to occur most commonly in bars, at parties, or social gatherings, it could also be important to focus on social influences [37] and promote safer drinking environments [40].

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