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Early Adolescent and Peer Drinking Homogeneity: Similarities and Differences Among European and North American Countries

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Abstract

This study examined associations between perceived peer and adolescent alcohol use in European and North American countries. Self-reported monthly alcohol use and adolescents' report of their peers' alcohol use were assessed in nationally representative samples of students aged 11.5 and 13.5 years ($n = 11,277$) in Greece, Scotland, Switzerland, and the United States who participated in the 2005/2006 Health Behavior in School-Aged Children survey. Cross-national associations between perceived peer and adolescent alcohol use were examined using logistic regressions and interactions by gender and country. Perceived peer and adolescent alcohol use were positively associated in all countries, but the association was notably weaker in Greece than in Scotland (boys), and in Greece compared to Switzerland (girls). Further examination of the underlying processes that explain stronger and weaker associations between perceived peer and adolescent alcohol use in some settings could guide the development of effective, culture-specific interventions.

Keywords

peers; alcohol use; cross-national

Background

Alcohol use is a common behavior with which many adolescents experiment, and drinking prevalence increases dramatically throughout adolescence (Adlaf, Begin, & Sawka, 2005; Currie et al., 2008a; Hibell et al., 2004; Johnston, O'Malley, Bachman, & Schulenberg, 2006). While experimentation with alcohol during adolescence is common in Western

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societies where alcohol is an important part of the national cultures, early initiation is a cause for concern.

Associations have been established between early and excessive alcohol involvement and a range of adverse consequences, including academic problems (Grunbaum et al., 2004), unplanned and risky sex (Eaton et al., 2006), alcohol-related injuries (Hingston, Heeren, Jamanka, & Howland, 2000; National Center for Statistics and Analysis, Department of Transportation, 2003), various physical and emotional problems (Tomlinson, Brown, & Abrantes, 2004; White & Swartzwelder, 2004), and future alcohol and drug-related problems (Guo, Collins, Hill, & Hawkins, 2000). A common concern is that early alcohol use can serve as a gateway to other drug use and illegal activity (Kandel, 1996). Early onset is not necessarily the cause of these problems but may serve as a powerful symptom of other problems that increase adolescents' vulnerability to alcohol-related problems and other health-compromising behaviors (Windle et al., 2008; Zucker, Donovan, Masten, Mattson, & Moss, 2008). Unfortunately, most research on adolescent drinking has focused on older adolescents and there is limited research on the etiology of early adolescent drinking.

While many factors have been found to be associated with adolescent drinking (Hawkins, Catalano, & Miller, 1992), including poor school adjustment, risk taking propensity, and the lack of authoritative parenting (Komro et al., 2001; Simons-Morton & Chen, 2005), perceived peer use is certainly one of the most important. Adolescent-peer homogeneity is a dominant characteristic of adolescent relationships (Bauman & Ennett, 1996; Simons-Morton & Farhat, 2010; Simons-Morton, Haynie, & Noelke, 2009). The strength of the association between adolescent and peer use is a matter of the substantial amount of time adolescents spend with their peers, relative to the time spent with parents and other social relationships, and the intense identification of adolescents with peers and peer groups (Urberg, Luo, Pilgrim, & Degirmencioglu, 2004).

Associations between adolescent and peer alcohol use have been demonstrated in several cross-national studies with older adolescents (Ciairano, Bosma, Mideli, & Settani, 2008; Kokkevi et al., 2007a; Kokkevi, Richardson, Florescu, Kuzman, & Stergar, 2007b). However, a limited number of studies have focused on early adolescents, despite the more adverse health consequences of early adolescent drinking (e.g., Eaton et al., 2006; Hingston et al., 2000; Windle et al., 2008) and the increased time spent with their peer group, which could create more opportunities for developing beliefs and attitudes about use (Urberg et al., 2004; Wiesner, Silbereisen, & Weichold, 2008; Windle et al., 2008). In fact, while associations between peer and adolescent substance use increases during adolescence, it is thought to peak around the ages of 11 to 13 years (Windle et al., 2008). The few studies that examined peer and early adolescent alcohol use in the Netherlands (Bot, Engels, Knibbe, & Meeus, 2005), Germany (Wiesner et al., 2008), and the United States (Simons-Morton & Chen, 2006) found them to be highly associated.

However, no previous studies comparatively assessed the strength of the association between peer and early adolescent drinking across multiple countries. Yet cross-national variations in this association may exist because of variations in cultural norms, prevalence of use, and the cost and legal status of alcohol, all of which could impact adolescents' perceived norms and

perceptions of their friends' use (Beyers, Toumbourou, Catalano, Arthur, & Hawkins, 2004). Other contextual factors that have been found to affect adolescents' perceptions of their friends' substance use include the extent of advertising of a particular substance (Burton et al., 2010) and perceived access to the substance (Reid, Manske, & Leatherdale, 2008), which, in the case of alcohol, may vary considerably across countries (Burki, 2010).

Drinking prevalence among adults varies considerably across countries. Alcohol is a cultural fixture in the countries of North America, Europe, and other regions with market economies (Rehm et al., 2003). Drinking prevalence is higher in Europe than in any other region of the world but varies within Europe. With some exceptions, drinking is more prevalent in Western European compared with Eastern European countries, and in Northern European compared with Southern European countries (Anderson & Baumberg, 2006).

The national prevalence rate of adolescent alcohol use in a particular country generally corresponds to the rate among adults in that country (Adlaf et al., 2005; Hibell et al., 2004; Johnston et al., 2006). Therefore, substantial cross-national variability in the prevalence of alcohol use among 11- and 13-year-olds can be noted, with higher rates in countries such as Italy, England, Scotland, and Greece, moderate rates in countries such as Romania, France, and the Netherlands, and relatively lower rates in countries such as Spain, Switzerland, Germany, and the United States (Currie et al., 2008a).

Given the substantial variability in national policies and drinking prevalence among adults and adolescents, we would expect associations between perceived peer and adolescent alcohol use to vary by country. Associations of peer and adolescent alcohol use may be weaker in cultures accepting of moderate youth drinking compared to cultures that are more restrictive of youth drinking (Beyers et al., 2004). Therefore, the association between peer and adolescent alcohol use might be weakest in countries such as Greece with highly tolerant cultures toward youth drinking. Furthermore, in such cultures, alcohol use, usually wine, is commonly consumed with meals in the context of the family (Ahlstrom & Osterberg, 2004).

Another gap in the literature on the association of peer and early adolescent alcohol use, besides the dearth of information on cross-national variability in these associations, pertains to gender differences in these associations. Recent trend analyses indicate cultural and gender convergence in adolescent alcohol use and drunkenness. Alcohol use and drunkenness have been decreasing in Western European countries and among boys, whereas they have increased among Eastern European countries and among girls (Kuntsche et al., 2011; Simons-Morton et al., 2009), underscoring the need to examine cross-national commonalities and differences in the etiology of adolescent alcohol use for both genders.

The prevalence of alcohol use is consistently greater among boys than girls, as evidenced by a comparative study of European and North American countries (Currie et al., 2008a). The generally greater alcohol prevalence among early adolescent boys than girls may make it more normative for boys than girls to affiliate with others who drink. Because of the lower prevalence of alcohol use among girls, those who drink are likely to select and socialize with

peers with similar drinking behaviors, thus contributing to a strong association between theirs and their peers' alcohol use (Kuntsche, Gossrau-Breen, & Gmel, 2009).

In summary, the literature on the relationship between adolescent and peer drinking remains incomplete. Most of the research has been conducted in the United States and with older adolescents (15- to 18-year-olds). No studies have been conducted that compared the association of *early* adolescents' and peers' alcohol use across multiple countries, and for boys and girls, although associations between *older* adolescents' and their peers' alcohol use have been demonstrated (Ciairano et al., 2008; Kokkevi et al., 2007a; Kokkevi et al., 2007b). The relatively low prevalence of alcohol use among younger adolescents makes it statistically feasible to examine associations between risk and protective factors and alcohol use only in large national studies. The Health Behavior in School-aged Children Study (HBSC) is perhaps the single best source of data on younger adolescents in multiple countries. Involving 42 countries in Europe and North America, the HBSC conducts school-based surveys every 4 years with national probability samples of youth with mean ages of 11.5, 13.5, and 15.5 years.¹

The purpose of this study is to examine cross-national associations between perceived peer and adolescent alcohol use among 11- and 13-year-olds, using HBSC data. Three study hypotheses are proposed:

Hypothesis 1: Perceived peer alcohol use will be positively associated with adolescent alcohol use.

Hypothesis 2: Positive associations between peer and adolescent alcohol use will be greater for girls than for boys.

Hypothesis 3: We expect cross-national variability in the positive association between peer and adolescent alcohol use, such as this association is weakest in the country most tolerant of adolescent drinking, Greece.

Method

Data and Procedures

This study uses data from the 2005/2006 HBSC, a nationally representative school-based study conducted every 4 years in more than 40 countries and coordinated by the World Health Organization. More information on methods and procedures can be found at <http://www.hbsc.org>. HBSC is aimed at increasing understanding of adolescent health, health behaviors, and the social context in which they occur. The study follows a common international protocol and has been conducted every 4 years since 1983. Students aged 11.5, 13.5, and 15.5 years on average were invited to participate. The recommended sample size for each participating country was ~1,500 students for each age group. Data were collected through self-report questionnaires distributed in the classrooms; respondents' anonymity

¹HBSC is an international study carried out in collaboration with WHO/EURO. The international coordinator of the 2005/2006 study was Candace Currie, University of Edinburgh, Scotland, and the data bank manager was Oddrun Samdal, University of Bergen, Norway. Data from the following countries were included in the present study (principal investigators are given in parentheses): Greece (Anna Kokkevi), Switzerland (Emmanuel Kuntsche), United Kingdom (Scotland: Candace Currie), and the United States (Ronald Iannotti).

was ensured throughout the data-collection process. Strict adherence to the international protocol was requested of every participating country to ensure cross-national consistency in survey instruments and data-collection procedures. Response rates for student participation were 80% or higher for each participating country, except for Scotland (response rate for the United Kingdom was 66%; Kuntsche et al., 2011). Each participating country obtained approval to conduct the survey from the relevant ethics review board or an equivalent regulatory body.

Analytical Sample

The analytical sample was restricted to 11- and 13-year-old respondents, given that the developmental significance of peers varies between early and older adolescents (Perry, Kelder, & Komro, 1993). Furthermore, the HBSC questionnaire includes a mandatory set of questions that all participating countries were required to include (e.g., alcohol use) and optional ones that countries could choose to include (e.g., peer use). In these analyses, we only included countries that asked the optional question about peer alcohol use. These countries were Greece, Greenland, Romania, Scotland, Switzerland, and the United States. However, for Greenland and Romania, the number of missing values on peer use was very high. These countries were therefore dropped from the analysis.

Variables

Dependent Variable

Monthly alcohol use: Students were asked how often they drank beer, wine, and liquor/spirits. For each alcoholic drink, response options were 1 = *never*, 2 = *rarely*, 3 = *every month*, 4 = *every week*, and 5 = *every day*. This variable was dichotomized by combining options 1 and 2 (indicating less than monthly alcoholic use, coded as “0”) and 3 through 5 (to reflect at least monthly alcohol use, coded as “1”).

Independent Variable

Perceived peer alcohol use: Students estimated how many of their friends drink alcohol. Response options were “none,” “a few,” “some,” “most,” and “all.” This variable was dichotomized into *none* (0) and *at least a few* (1).

Moderators: *Gender (male/female)* and *country* were included as moderators to test whether the association of peer alcohol use with adolescent alcohol use varied by subgroups of adolescents characterized by these variables.

Controls: *Family affluence*, *family composition (two-parent/other)*, and *age (11 and 13 years)* were included as control variables because of their potential association with adolescent (Currie et al., 2008a) and peer (Brown, Bakken, Ameringer, & Mahon, 2008; Simons-Morton & Farhat, 2010) alcohol use. *Family affluence*, an indicator of adolescents’ socioeconomic status, was constructed from questions about family wealth and categorized into tertiles. A review (Currie et al., 2008b) indicated that the scale has good content and external validity.

Statistical Analyses

All analyses were conducted using Stata 11, and the robust option was used to adjust for the cluster-based sampling design of HBSC. Descriptive statistics were computed for all variables, separately by country and gender. To examine gender differences in the association of peer and adolescent alcohol use, logistic regression models were fitted that regressed adolescent alcohol use on peer alcohol use, gender, the interaction of peer alcohol use and gender, and the control variables (Set 1 of analyses).

Cross-country differences in the association of peer and adolescent alcohol use were investigated by regressing adolescent alcohol use on perceived peer alcohol use, country, two-way interactions between peer alcohol use and country, and the control variables, separately by gender (Set 2). In the initial full models, all variables and interaction terms were entered simultaneously (with United States as the referent group). Postestimation Wald tests (StataCorp, 2007a, 2007b), with Bonferroni adjustments, were then conducted to estimate (a) the joint significance of all interaction terms (null hypothesis = no differences across all countries, i.e., regression coefficients of all interactions in the model are not significantly different from zero) and (b) the significance of every possible comparison between *any country pair* (for each country pair, null hypothesis = no difference between these two countries, i.e., regression coefficients of interactions involving these two countries are not significantly different). Given that the initial set of interactions in the model only tests for country differences in comparison to the United States, the Wald test was necessary to determine which countries were significantly different from each other, and not only in relation to the United States.

In all sets of analyses, only interactions that were significantly associated with the outcome in the full model were retained in the final model. Significance was set at the 95% confidence level. When evidence of subgroup differences emerged, as indicated by final models with significant interaction terms, the analyses were stratified into subgroups of the moderators. All analyses were conducted on cases with complete data on all covariates as the overall number of missing values was minimal (5% for Switzerland and the United States, 8% for Scotland, and 3% for Greece).

Results

Sample Characteristics

Sample characteristics are presented in Table 1. *Monthly* alcohol use varied across countries and was lowest for boys in the United States and for girls in Switzerland and highest in Scotland for both genders. While *at most* one in four respondents (boys in Scotland) reported monthly alcohol use, *at least* one in four respondents perceived that at least a few of their peers drank alcohol. Among boys, almost half of respondents in Scotland and Greece reported that at least a few of their peers drank alcohol. Among girls, the range was almost one in four girls in Switzerland, and one in two in Greece. Most respondents came from two-parent families, although the percentage varied across countries and was lowest in the United States. The percentage of respondents from low family affluence was highest in Greece for boys and girls.

Gender Differences in the Association of Peer and Adolescent Alcohol Use

Among all countries, gender differences in the association of peer and adolescent alcohol use were detected, as evidenced by significant gender-by-perceived peer alcohol use interactions (United States: $OR = 2.02$, 95% CI [1.65, 2.49]; Scotland: $OR = 2.09$, 95% CI [1.85, 2.38]; Greece: $OR = 1.73$, 95% CI [1.44, 2.09]; and Switzerland: $OR = 2.48$, 95% CI [1.85, 3.31]), and the associations were stronger for girls than for boys (data not shown). Therefore, all subsequent analyses were stratified on gender.

Cross-Country Differences in the Association of Peer and Adolescent Alcohol Use

Cross-country differences in the association of peer and adolescent alcohol use were observed for boys and girls, as evidenced by the significant global Wald tests (Table 2; boys: 9.57; $p < .05$; girls: 8.97; $p < .05$). Among boys, postestimation tests with Bonferroni adjustments indicated that the positive associations between peer and adolescent alcohol use were significantly different between Greece and Scotland (Wald test = 7.79, $p < .05$). Among girls, these associations significantly differed between Greece and Switzerland (Wald test = 7.09, $p < 0.05$).

Association of Peer and Adolescent Alcohol Use: Final Models

The results of the final models (controlling for sociodemographics and stratified by country) for the association of peer and adolescent alcohol use are displayed in Table 3 and Figures 1 (for boys) and 2 (for girls).

Among boys, the strength of the association of peer and adolescent alcohol use varied by country. In particular, the association was significantly weaker in Greece ($OR = 4.44$, 95% CI [3.12, 6.31]) than in Scotland ($OR = 8.82$, 95% CI [6.65, 11.70]).

For girls, results of the previous analyses documented cross-country variations in the association of peer and adolescent alcohol use, with the association being significantly weaker in Greece ($OR = 5.34$, 95% CI [3.27, 8.71]) than in Switzerland ($OR = 16.64$, 95% CI [9.34, 29.63]).

Additional Analyses

Given that, for boys and girls, the association of perceived peer and adolescent alcohol use significantly differed between Greek adolescents and adolescents from other countries, sources of these differences were further examined. As mentioned in the background section, consumption of wine may be higher in Greece compared to other countries. The differential context of adolescent wine use compared to other alcohol use (e.g., consumed generally with family meals rather than with friends (Ahlstrom & Osterberg, 2004) may affect adolescents' perceptions of peer alcohol use. We therefore created another outcome variable, *monthly alcohol use excluding wine*, following the methodology outlined for the main outcome variable, *monthly alcohol use*. We then regressed adolescent alcohol use excluding wine on perceived peer alcohol use, country, two-way interactions between peer alcohol use and country, and the control variables, separately by gender, following the method outlined in the analysis plan. Postestimation Wald tests, with Bonferroni adjustments, were then conducted to estimate the joint significance of all interaction terms.

In these supplemental analyses, the global Wald test was not significant for either gender, indicating no significant cross-national differences in the association of perceived peer and adolescent alcohol use that excludes wine (for boys: $OR = 8.98$, 95% CI [7.38, 10.92]; for girls: $OR = 12.13$, 95% CI [9.37, 15.70]).

Discussion

The aim of this study was to examine cross-national associations between perceived peer and adolescent alcohol use among 11- and 13-year-olds. The findings confirm our first hypothesis of a universal association between perceived peer and adolescent alcohol use. While many studies have documented the positive association of perceived peer and adolescent alcohol use in middle and later adolescence, few studies have done so among early adolescents. This developmental stage is characterized by a transition in the relative importance of various social groups for adolescents, as time spent with their peer group increases while time spent with their parents decreases (Glynn, 1981; Perry et al., 1993).

The association between peer and adolescent alcohol use was significantly stronger for girls than for boys, as posited in our second hypothesis, except among United States youth. The consistent cross-national moderating role of gender in the association of peer and adolescent alcohol use is consistent with previous findings (Dick et al., 2007; Kokkevi et al., 2007b; The National Center on Addiction and Substance Abuse at Columbia University, 2003). Furthermore, studies including adolescents ranging in age from early to later adolescence showed that the association between peer and adolescent substance use is stronger for girls at younger ages and for boys at older ages (Chassin, Presson, Montello, Sherman, & McGrew, 1986; Rohrbach & Milam, 2006).

The stronger association between perceived peer and adolescent alcohol use for girls compared to boys could be due to the fact that girls spend more time with their friends, are more involved in their peer group than boys, and are likelier than boys to perceive their friendships as more intimate, exclusive and helpful (The National Center on Addiction and Substance Abuse at Columbia University, 2003). Another possibility may be that the prevalence of alcohol use among early adolescents is much lower among girls than among boys (Simons-Morton et al., 2009). Given that this behavior may be more deviant for girls, those wanting to drink are more likely to seek peers with similar drinking behaviors than boys, for whom alcohol use could be more normative and would not necessarily need to occur within the context of peer relationships (Kuntsche et al., 2009).

Finally, in line with our third hypothesis, this study was the first, to our knowledge, to document varying levels of the strength of the association between perceived peer and adolescent alcohol use among nationally representative samples of early adolescents from Europe and North America. While this association was significant in all four countries studied, it was notably weaker in Greece than in Scotland for boys, and in Greece compared to Switzerland, for girls. However, the weaker associations in Greece were not observed when the alcohol outcome excluded wine, suggesting a potential protective effect of contextual factors related to wine drinking, such as drinking culture, drinking policies, and parental supervision and control.

The significantly weaker association of peer and adolescent alcohol (including wine) use in Greece compared to other countries, for boys and girls, may reflect cultural differences in social norms and values regarding alcohol use. Notably, drinking policies vary across these countries. The minimum age to purchase alcohol is 16 in Switzerland and 18 in Scotland, but drinking is allowed at younger ages (International Center for Alcohol Policies, 2010). In Greece, formal and informal control over adolescent alcohol use is weak and daily moderate use, usually with meals, is common.

Moreover, countries may be characterized as having a “wet” or “dry” drinking culture (Room & Makela, 2000). In wet cultures, mostly Mediterranean countries such as Greece, alcohol is integrated in daily life and usually consumed with meals, and wine is often the beverage of choice. In contrast, in dry cultures, mainly North European and North American countries, alcohol use is more restricted by policy—if not by availability—and is not common during everyday meals, and distilled spirits are usually the beverage of choice (Ahlstrom & Osterberg, 2004). In these “dry” cultures, episodic “binge drinking” is more common and individuals are more likely to attribute alcohol-related adverse consequences (e.g., injury, loss of control over drinking) to their alcohol consumption than people in “wet” countries (Kuendig et al., 2008). These cultural norms are reflected in the drinking patterns of this sample, as documented by Currie and colleagues (2008a): Wine was the alcoholic beverage most common among Greek respondents while beer or spirits were more prevalent in the United States, Scotland, and Switzerland.

A weaker relationship between peer and adolescent alcohol use may be expected in countries where alcohol use (generally wine) among youth is more accepted and a common part of family meals, as is the case for Greece (Gefou-Madianou, 1992; Kokkevi & Stefanis, 1991). In contrast, in dry, non-wine producing, Northern and Western European countries, alcohol in general and wine in particular are usually not consumed as part of family meals. Early adolescents wanting to drink alcohol often seek friends who provide alcoholic drinks, usually beer and distilled spirits rather than wine, and drink with them (Kuntsche, Rehm, & Gmel, 2004).

While not a definite proof of the differential effect of context on adolescents’ perceptions of their peers’ alcohol use, our additional analyses provide some evidence that such contexts do, in fact, affect adolescents’ perceptions of their peers’ alcohol use. When wine was excluded from the outcome measure, no cross-national variations were observed in the association of perceived peer and adolescent alcohol use, for either boys or girls. As mentioned previously, wine is more frequently consumed in wet cultures, such as Greece, and consumption often occurs during family meals. Other liquors (beer and spirits) are more often consumed in dry cultures, and usually with friends, rather than in a family setting. Our additional analyses used only beer/spirits as the outcome, and the context of their use is similar across countries, mostly in peer groups. In such instances, no cross-national differences were observed, meaning that, when wine is excluded, the association of peer and adolescent alcohol use in Greece was comparable with that in Scotland or Switzerland.

Our findings suggest that the relatively high prevalence of drinking among early adolescents in Greece may be less attributable to perceptions of peer use than the high prevalence of

drinking among adolescents in Scotland or Switzerland, a hypothesis that could be further tested in future studies. Furthermore, these findings suggest that associations of perceived peer and adolescent alcohol use may be weaker in cultures accepting of moderate youth drinking compared with cultures that are more restrictive of youth drinking, a finding observed in a cross-national comparison between youth in the United States, with stringent, abstinence-focused policies, and youth in Australia, which emphasizes harm-reduction policies (Beyers et al., 2004).

Strengths and Limitations

Future Directions—As with other prominent national surveys such as Monitoring the Future and ESPAD, the HBSC relies on noncontext-specific measures of alcohol use, and the observed cross-national differences in adolescent alcohol use may be due to a failure to capture the distinction between family and nonfamily alcohol use across countries. However, the HBSC study strives to minimize this measurement error by following a strict international protocol for data collection to ensure maximum comparability across countries. Questionnaires are translated from English to each country's language, and then back-translated to English to minimize any translation errors or misinterpretation. Once collected, data from all countries are sent to a unique data coordinating center (in Norway) that is responsible for data cleaning, checking for inconsistencies, and more generally, combining the data from all countries into one usable data set.

Also, the cross-sectional nature of the study does not allow causal inference. These analyses found consistent cross-national associations between early adolescent and peer alcohol use, but it was not possible to determine if these associations were the product of socialization or selection. Both pathways are plausible and are complementary (Simons-Morton & Farhat, 2010); additional longitudinal research is needed to disentangle causality in a cross-national perspective. Another limitation is the study's reliance on adolescents' reported measures of peer alcohol use instead of peers' self-reports of alcohol use, potentially inflating the association between peer and adolescent alcohol use (Bauman & Ennett, 1996; Aseltine, 1995). However, while adolescents may overestimate the frequency of their peers' alcohol use, studies suggest that *perceptions* of peer behavior are a stronger predictor of adolescents' behavior than peers' *actual* behavior (The National Center on Addiction and Substance Abuse at Columbia University, 2003). Finally, this study assessed any monthly alcohol use rather than the frequency of use. Cross-country differences in the influence of peers on adolescents' *frequency of use* could be more pronounced than cross-country differences in their influence on *any use*, given previous findings of the differential association of peer substance use with adolescents' substance use initiation, stage of use, and frequency of use (Simons-Morton & Farhat, 2010). However, given the very low prevalence of alcohol use among such young respondents, it was not possible to investigate these relationships with frequency of use.

Major study strengths include the nationally representative samples of early adolescent youth in multiple countries and the use of similar measures of adolescent and perceived peer drinking across countries, which enabled the examination of the link between peer and adolescents' alcohol use in varying cultural contexts. Indeed, our findings point to the

universality of positive associations between perceived peer and adolescent alcohol use, although aspects of these associations are context specific, as evidenced by the cross-national variations in the magnitude of these. Analyses involving early adolescents are of particular interest, given the relatively low drinking prevalence in this age group. Finally, this study used a common international protocol and similar age groupings, thus providing more valid cross-national comparisons and a much-needed addition to the literature on cross-national differences in the associations of perceived peer and adolescent alcohol use.

Our findings suggest that associations of peer and adolescent alcohol use may depend in part on the type of alcohol used, which varies by country and culture, and could be dependent on contextual factors (e.g., wine is more likely to be consumed with meals, and with family). Future studies should assess these contextual factors associated with alcohol use for a better understanding of adolescent drinking patterns across cultures and racial/ethnic groups.

Conclusion

In conclusion, the findings suggest that peer and adolescent alcohol use are positively associated in different cultural contexts, with varying strength of association by sex and country. Therefore, prevention strategies and programs may benefit from examining underlying processes that explain weaker associations in some settings and adapting them to cultural settings where associations are the highest. Furthermore, the quasiuniversality of the stronger association of peer with adolescent alcohol use for girls compared to boys indicates that prevention strategies could benefit from the development of gender-specific components.

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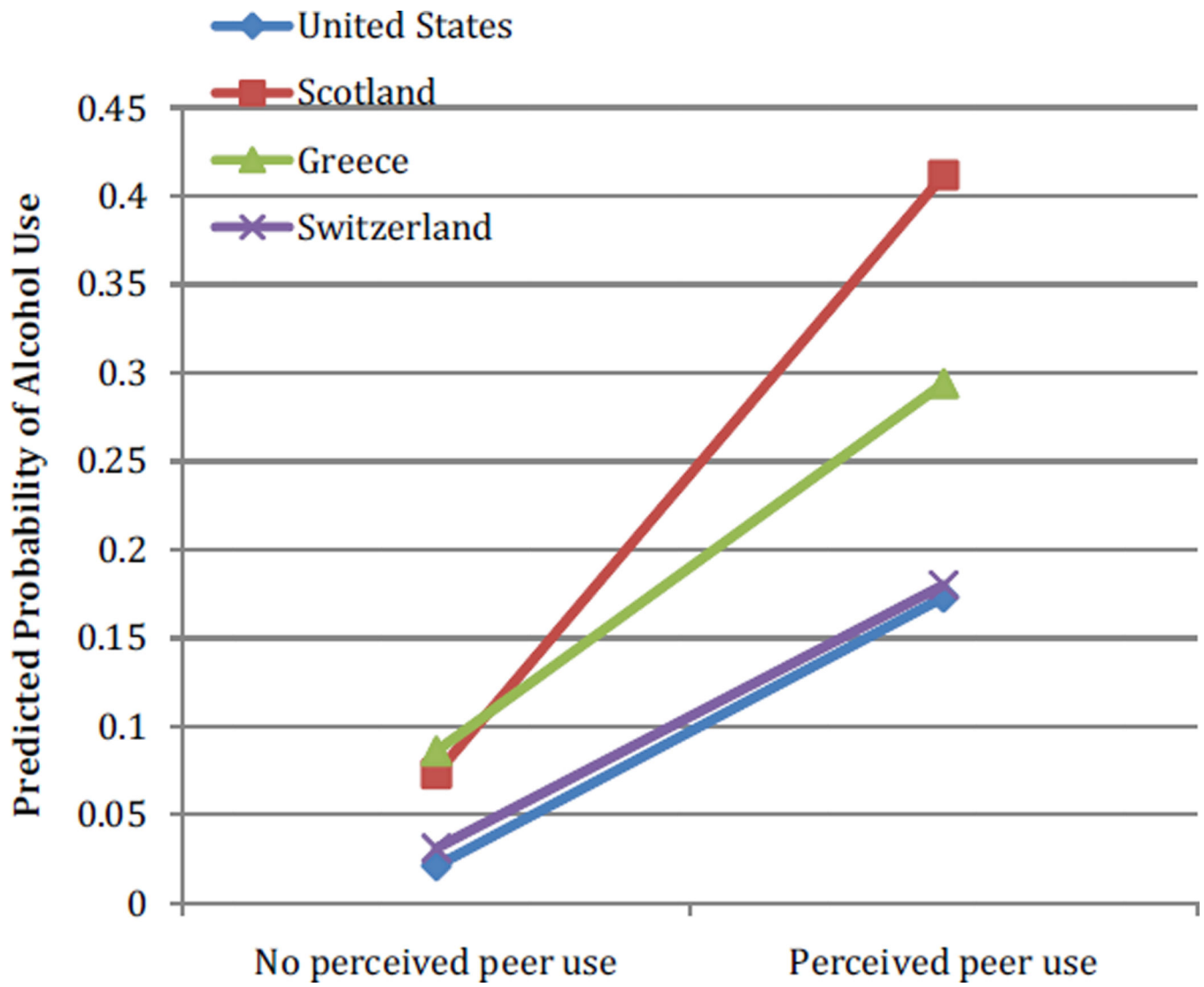


Figure 1. Predicted probability of adolescent alcohol use by peer alcohol use, by country, for boys
 Note: Controls were set at 11 years (age), two-parent family (family composition), and medium (FAS). Greece and Scotland are significantly different at $p < .05$.

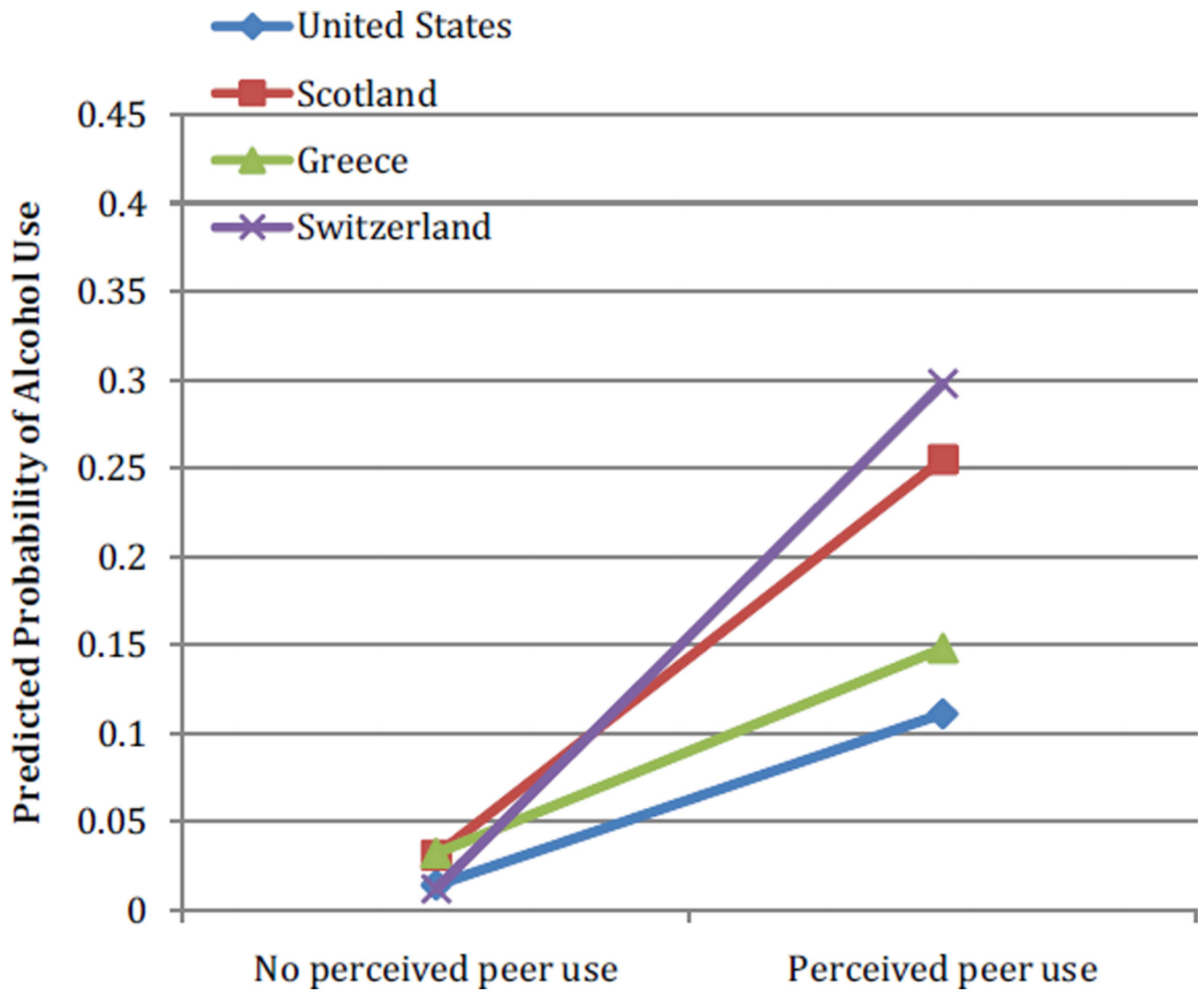


Figure 2. Predicted probability of adolescent alcohol use by peer alcohol use, by country, for girls
 Note: Controls were set at 11 years (age), two-parent family (family composition), and medium (FAS). Greece and Switzerland are significantly different at $p < .05$.

Table 1
Demographic Characteristics, Peer, and Adolescent Substance Use, by Gender and Country

| | Boys (n = 5,372) | | | | | Girls (n = 5,905) | | | | |
|-------------------------------------|------------------------------|-------------------------|-----------------------|----------------------------|----------------------|------------------------------|-------------------------|-----------------------|----------------------------|----------------------|
| | United States (n = 1,136) | Scotland (n = 1,757) | Greece (n = 1,065) | Switzerland (n = 1,414) | p value ^a | United States (n = 1,344) | Scotland (n = 1,891) | Greece (n = 1,150) | Switzerland (n = 1,520) | p value ^a |
| Prevalence (%) | | | | | | | | | | |
| Monthly alcohol use | | | | | | | | | | |
| No | 90.4 | 75.0 | 77.5 | 88.7 | <.001 | 90.9 | 79.1 | 86.4 | 94.3 | <.001 |
| Yes | 9.6 | 25.0 | 22.5 | 11.3 | | 9.1 | 20.9 | 13.6 | 5.7 | |
| Monthly alcohol use, excluding wine | | | | | | | | | | |
| No | 91.5 | 76.2 | 82.3 | 90.0 | <.001 | 91.9 | 80.8 | 89.1 | 94.9 | <.001 |
| Yes | 8.5 | 23.8 | 17.7 | 10.0 | | 8.1 | 19.2 | 10.9 | 5.1 | |
| Perceived peer alcohol use | | | | | | | | | | |
| No peers | 70.6 | 53.8 | 51.3 | 68.4 | <.001 | 67.0 | 56.6 | 52.4 | 77.4 | <.001 |
| At least a few | 29.4 | 46.2 | 48.7 | 31.6 | | 33.0 | 43.4 | 47.6 | 22.6 | |
| Family composition | | | | | | | | | | |
| Two parents | 70.3 | 77.5 | 87.2 | 86.8 | <.001 | 69.6 | 78.5 | 87.7 | 88.1 | <.001 |
| Other | 29.7 | 22.5 | 12.8 | 13.2 | | 30.4 | 21.5 | 12.3 | 11.9 | |
| Family affluence | | | | | | | | | | |
| Low | 23.2 | 32.0 | 39.6 | 23.0 | <.001 | 25.5 | 34.7 | 48.2 | 27.0 | <.001 |
| Medium | 50.4 | 47.9 | 49.7 | 55.9 | | 47.3 | 46.1 | 43.4 | 55.3 | |
| High | 26.4 | 20.1 | 10.7 | 21.1 | | 27.2 | 19.2 | 8.4 | 17.7 | |
| Age (years) | | | | | | | | | | |
| 11 | 41.2 | 42.3 | 49.3 | 47.4 | <.001 | 41.7 | 44.7 | 46.3 | 48.5 | <.01 |
| 13 | 58.8 | 57.7 | 50.7 | 52.6 | | 58.3 | 55.3 | 53.7 | 51.5 | |

^a. Chi-square tests for differences between countries within gender.

Table 2

Regression Models for the Associations Between Peer and Adolescent Alcohol Use, by Gender

| | Boys (<i>n</i> = 5,372) | Girls (<i>n</i> = 5,905) |
|--|--|--|
| | Adjusted <i>OR</i> (95% CI) | Adjusted <i>OR</i> (95% CI) |
| Peer alcohol use | | |
| No peers | Ref | Ref |
| At least a few | 9.50 [5.94, 15.18] | 8.82 [5.49, 14.18] |
| Country | | |
| United States | Ref | Ref |
| Switzerland | 1.54 [0.93, 2.55] | 0.58 [0.30, 1.10] |
| Scotland | 2.89 [1.82, 4.61] | 2.15 [1.29, 3.57] |
| Greece | 3.96 [2.41, 6.50] | 2.08 [1.16, 3.73] |
| Interactions | | |
| Peer alcohol use × United States | Ref | Ref |
| Peer alcohol use × Switzerland | 0.74 [0.41, 1.36] | 1.63 [0.78, 3.40] |
| Peer alcohol use × Scotland | 0.90 [0.52, 1.55] | 1.24 [0.70, 2.20] |
| Peer alcohol use × Greece | 0.48 [0.27, 0.86] | 0.62 [0.32, 1.18] |
| Family composition | | |
| Other | Ref | Ref |
| Two parents | 0.76 [0.63, 0.93] | 0.82 [0.66, 1.01] |
| Family affluence | | |
| Low | Ref | Ref |
| Medium | 1.13 [0.94, 1.35] | 1.15 [0.95, 1.40] |
| High | 1.37 [1.10, 1.72] | 1.46 [1.14, 1.87] |
| Age (years) | | |
| 11 | Ref | Ref |
| 13 | 1.39 [1.17, 1.66] | 2.10 [1.67, 2.63] |
| Pseudo <i>R</i> ² | .18 | .23 |
| Postestimation statistics | | |
| Global Wald test for all pairwise comparisons of countries | Wald Test: χ^2 (<i>df</i>) 9.57 (3)* | Wald Test: χ^2 (<i>df</i>) 8.97 (3)* |
| Pairwise country comparisons of peer alcohol use | | |
| USA vs. Switzerland | 0.94 (1) | 1.72 (1) |
| USA vs. Scotland | 0.14 (1) | 0.54 (1) |
| USA vs. Greece | 5.98 (1) | 2.13 (1) |
| Switzerland vs. Scotland | 0.65 (1) | 0.70 (1) |
| Switzerland vs. Greece | 2.76 (1) | 7.09 (1)* |
| Scotland vs. Greece | 7.79 (1)* | 6.26 (1) |

Note: Country is included as a moderator. In the postestimation statistics, significant differences ($p < .10$) indicate significant differences in the association of peer and adolescent alcohol use for the corresponding countries.

* $p < .05$.

** $p < .01$.

 $p < .001$.

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Table 3
 Regression Models for the Associations Between Peer and Adolescent Alcohol Use, by Gender, Stratified by Country

| | Boys (n = 5,372) | | | | | Girls (n = 5,905) | | | | |
|---|------------------------------|-------------------------|-----------------------|----------------------------|------------------------------|-------------------------|-----------------------|----------------------------|-----|-----|
| | United States (n = 1,336) | Scotland (n = 1,757) | Greece (n = 1,065) | Switzerland (n = 1,414) | United States (n = 1,344) | Scotland (n = 1,891) | Greece (n = 1,150) | Switzerland (n = 1,520) | | |
| Monthly alcohol use: Adjusted OR (95% CI) | | | | | | | | | | |
| Perceived peer alcohol use | | | | | | | | | | |
| No peers | Ref | Ref | Ref | Ref | Ref | Ref | Ref | Ref | Ref | Ref |
| At least a few | 9.66 [6.07, 15.37] | 8.82 [6.65, 11.70] | 4.44 [3.12, 6.31] | 6.88 [4.70, 10.05] | 8.80 [5.44, 14.23] | 10.55 [7.48, 14.86] | 5.34 [3.27, 8.71] | 16.64 [9.34, 29.63] | | |
| Family composition | | | | | | | | | | |
| Other | Ref | Ref | Ref | Ref | Ref | Ref | Ref | Ref | Ref | Ref |
| Two parents | 0.66 [0.42, 1.03] | 0.95 [0.71, 1.28] | 0.61 [0.40, 0.94] | 0.66 [0.43, 1.03] | 0.75 [0.48, 1.15] | 0.80 [0.59, 1.09] | 0.80 [0.47, 1.36] | 1.28 [0.64, 2.56] | | |
| Family affluence | | | | | | | | | | |
| Low | Ref | Ref | Ref | Ref | Ref | Ref | Ref | Ref | Ref | Ref |
| Medium | 0.76 [0.45, 1.30] | 1.21 [0.92, 1.59] | 1.21 [0.87, 1.70] | 1.09 [0.69, 1.72] | 0.87 [0.54, 1.42] | 1.19 [0.89, 1.59] | 1.33 [0.90, 1.94] | 1.02 [0.60, 1.75] | | |
| High | 1.06 [0.60, 1.87] | 1.42 [1.00, 2.00] | 0.96 [0.57, 1.61] | 1.81 [1.09, 3.00] | 1.09 [0.63, 1.88] | 1.49 [1.04, 2.14] | 2.59 [1.46, 4.57] | 0.93 [0.45, 1.94] | | |
| Age (years) | | | | | | | | | | |
| 11 | Ref | Ref | Ref | Ref | Ref | Ref | Ref | Ref | Ref | Ref |
| 13 | 1.21 [0.75, 1.96] | 1.25 [0.95, 1.64] | 1.60 [1.14, 2.23] | 1.50 [1.01, 2.23] | 2.11 [1.24, 3.60] | 2.31 [1.65, 3.24] | 2.17 [1.37, 3.45] | 1.39 [0.78, 2.47] | | |
| Pseudo R2 | .17 | .17 | .11 | .15 | .16 | .23 | .14 | .22 | | |