Perception of high alcohol use of peers is associated with high personal alcohol use in firstyear university students in three Central and Eastern European countries

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Running title: Alcohol use perceptions in Europe

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Abstract:

Objectives: The objectives of this study were to assess discrepancies between estimated peer and personal drinking behavior and to determine associations between perceptions of

peer and personal drinking behavior among university students from Hungary (HU), Lithuania (LT), and the Slovak Republic (SK).

Methods: 2,554 freshman university students completed an online questionnaire on the frequency of their personal alcohol use, the number of heavy drinking occasions and on their perception concerning the corresponding drinking behavior of a typical student. Associations between perceived peer and personal use were analysed by means of logistic regression, adjusting for sex.

Results: The majority of students across all countries thought their peers drink more frequently and are more often involved in heavy drinking occasions than themselves. Students who perceived the frequency of peer alcohol use to be higher were more likely to drink alcohol twice a week or more often (SR: OR=3.81, 95% CI=2.51-5.79; LT: OR=3.16, 95% CI=2.11-4.75; HU: OR=2.10, 95% CI=1.53-2.87) compared with students who drink alcohol monthly or less. Those who perceived the number of peer heavy drinking occasions as high were more likely to report heavy drinking weekly or more often (SR: OR=3.16, 95% CI=1.925.20; LT:OR=3.56, 95% CI=2.14-5.94; HU:OR=1.41, 95% CI=0.79-2.51) compared with students who report heavy drinking less than monthly.

Conclusions/Importance: University students perceived peer alcohol use to be higher than their personal use. Given the association between perceptions and personal alcohol use, future research should investigate if targeting perceptions in the surveyed countries may have an impact on alcohol use.

Background:

European University students drink alcohol infrequently, but when they do so, they consume large amounts of alcohol (Akmatov, Mikolajczyk, Meier, & Krämer, 2011; Sebena, Orosova, Mikolajczyk, & van Dijk, 2011; Stock et al., 2009). This heavy alcohol use is a concern as it is associated with a variety of health, academic and social consequences (Perkins, 2002). Different intervention approaches have addressed alcohol use among university and college students (Cronce & Larimer, 2011; Dennhardt & Murphy, 2013), among them are social norms-interventions that are well known in the US (Perkins, 2014). In 2009, a Cochrane Review by Moreira, Smith, and Foxcroft (2009) and an update of the review in 2015 (Foxcroft, Moreira, Almeida Santimano, & Smith, 2015) revealed that social norms-interventions show some small but significant effects to reduce alcohol use and related problems among University or college students in the short term. However, most of the included social norms-interventions in both reviews examined effects on NorthAmerican college and University students, with lack of European research in this field. Up to now, most of the research that has formed the basis for social norms interventions has been conducted in the USA (Borsari & Carey, 2001; Neighbors, Dillard, Lewis, Bergstrom, & Neil, 2006; Perkins, Haines, & Rice, 2005), Canada (Perkins, 2007) and New Zealand (Kypri & Langley, 2003). The studies indicated that students tend to perceive that their peers drink more alcohol than themselves (self-other discrepancies), and greater self-other discrepancies exist among females than males (Borsari & Carey, 2003). Perceptions of peer alcohol use were also found to be associated with personal alcohol use behaviors (Perkins, 2007). According to this premise, such overestimations of peer alcohol use can exert social pressure on the individual and consequently lead them to adapt their own alcohol

consumption to match this perceived norm (McAlaney, Bewick, & Hughes, 2011). If this is true, challenging misperceptions of risk behavior through peer education activities or personalized feedback lessens the social pressure on the individual and personal use consequently falls (Berkowitz, 2004).

In recent years, some European studies have examined misperceptions of alcohol use among University students in the UK (McAlaney & McMahon, 2007) and France (Franca, Dautzenberg, & Reynaud, 2010) and have reported findings comparable to those of NorthAmerican studies.

So far no studies have examined misperceptions of peer alcohol use among University students in Central or East Europe. However, findings amongst US University and college students cannot be unconditionally applied to their European counterparts. First of all, US students show different alcohol use behaviors, in that they consume alcohol less regularly than European students (Wicki, Kuntsche, & Gmel, 2010). In addition, risky alcohol consumption in the US is often related to formal organized structures such as fraternities, which are uncommon in Europe (Keller, Maddock, Laforge, Velicer, & Basler, 2007; Wicki et al., 2010). Furthermore, differences in legislation such as legal drinking age could result in differences in alcohol use perception between North-American and European University students (McAlaney et al., 2011; Wicki et al., 2010). There are also differences between West and East/Central European students' alcohol use behavior (Dantzer, Wardle, Fuller, Pampalone, & Steptoe, 2006; Stock et al., 2009) and also in culture, legislation and educational systems within Europe (Wicki et al., 2010).

To our knowledge there is only one study by Page and colleagues (2008) focusing on secondary school adolescents in Hungary, Slovak Republic, Czech Republic and Romania. Page and colleagues (2008) found that Central-Eastern European adolescents held inaccurate perceptions on the number of current alcohol users and number of students engaging in heavy episodic drinking in their peer group. Furthermore, the study showed that the perception of peer alcohol use was associated with students' personal alcohol use (Page et al., 2008). University students, however, find themselves in another phase of life compared to adolescents. Their life is characterized by identity exploration and less dependency on parents. At the same time, peers gain influence and risky health behaviors such as substance use are peaking (Arnett, 2000). Therefore, findings among adolescents' perceptions of substance use are not transferable without restrictions to University students.

Consequently, studies focusing on East and Central European University students are of importance in the field of research on misperceptions of alcohol use, particularly if the social norms approach is to be applied within various European settings.

Objectives:

The two objectives of this study using a sample of University students from three Central and Eastern European countries are: (a) to investigate whether the frequency of alcohol use and the number of heavy drinking occasions of a typical student are perceived by the students to be higher than the own personal consumption and (b) to evaluate whether perception of high levels of alcohol use or heavy drinking occasions in peers is associated with high personal alcohol use.

Methods

Procedures:

This study is based on data collected in 2011 from several universities in three countries: four universities in Lithuania, two universities in Hungary and four universities in the Slovak Republic. Data were collected as part of wave 1 of the Student Life Cohort in Europe (SLiCE), a multinational longitudinal study of University students from several European countries. SLiCE was developed from previous activities of the Cross National Student Health Survey (El Ansari et al., 2007). The collaborating universities were selected through personal contacts of researchers involved in the survey.

Participants:

Recruitment strategies differed across the three countries. At all participating universities SLiCE was introduced to first-year students during lectures and seminars. Initially it was planned to contact students via email. Due to institutional restrictions, this was not possible at all universities. All four universities in Lithuania and one in the Slovak Republic obtained access to email distribution lists of all enrolled first-year students at the respective universities. In both universities in Hungary and in one University in the Slovak Republic, the study was also promoted using flyers and posters. Participation in the study was voluntary and anonymous. Students were informed that by completing the questionnaire they were providing their informed consent to participate. No incentives were provided and students did not get class credits for participating in the study. Permission to conduct the study was granted by the ethical commissions of participating institutions.

After registration on the website, students were sent e-mails requesting them to complete a self-administered multi-theme online questionnaire covering a range of questions on students' health behavior, including substance use behavior.

Measurements

To indicate personal alcohol use, students were asked "How often do you have a drink containing alcohol?" The number of heavy drinking occasions was assessed using the question "How often do you have six or more drinks on one occasion?" In a statement placed before the alcohol-related questions, students were informed that a drink was defined as one glass/can (0.3 liter) beer or one glass (1/8 liter) (sparkling) wine or one glass liquor (0.02 liter with approx. 40% alcohol).

The response options for frequency of alcohol consumption were 'Never', 'Less than monthly', '2-4 times a month', '2-3 times a week', and '4 or more times a week'. The response options for the number of heavy drinking occasions were 'Never', 'Less than monthly', 'Monthly', 'Weekly', and 'Daily or almost daily'.

Perceptions of rates of alcohol use and number of heavy drinking occasions of a typical student were assessed using items based on the corresponding personal use questions, but referring to a typical student at their own university: "How often do you think a typical student at your university has a drink containing alcohol?" and "How often do you think a typical student at your university has six or more drinks on one occasion?"

Statistical analysis:

Descriptive statistics regarding alcohol use were examined. Because numbers in the highest alcohol use categories for both variables assessing personal alcohol use were very small, we combined the two highest categories. Furthermore, gender–specific self-other discrepancies (percentages of respondents who perceived the alcohol use of a typical student as higher/ identical/ lower than the reported corresponding own behavior) were calculated. Thirdly, multinomial logistic regression models were used to investigate associations between perceived alcohol use behaviors of a typical student and the personal behaviors. Drinking alcoholic drinks monthly or less and reporting heavy drinking less than monthly were used as the reference categories of the dependent variable for the analysis. The corresponding perceived alcohol use of a typical student variable was used as an independent variable in the models, and respondents' sex was added for adjustment. We added interaction terms to the regression models to examine whether sex of the respondent or country moderates the association between perceived and personal behavior. Since there was a significant interaction between country and perception, we conducted stratified analyses by country. For the regression models, non-alcohol users were excluded as this group is influenced by peer drinking norms in a different way than alcohol drinking students (Cho, 2006). Data analysis was performed using SPSS for windows, version 20.0.

Results:

The self-administered online questionnaire was completed by 2,564 University students across the three participating countries distributed as follows: Lithuania (36.2%), Hungary (32.3%) and the Slovak Republic (31.5%). More than 70% across all countries were female students (Table 1). Further characteristics of the sample (age, religion and accommodation during the semester) are also provided in Table 1. Ninety-for percent of students from the Slovak Republic, 93.2% of students from Lithuania and 98.8% of students from Hungary provided information on the frequency of alcohol use. A considerably lower number of students from the Slovak Republic and from Lithuania answered the question about the number of heavy drinking occasions (Slovak Republic: 83.4%; Lithuania: 80.6%; Hungary: 98.8%).

The majority (more than 60%) of participants across the three countries perceived their peers as having higher frequency of alcohol use and number of heavy drinking occasions compared to their personal behavior. Self-other discrepancies between own alcohol use and peer use stratified by sex are presented in Table 2.

Interaction terms showed that the effect of perception on the outcome variable was modified by country but not by sex in both models. Results of a stratified multinomial logistic regression analyses showed differences in drinking behavior by sex, with male students reporting a higher frequency of alcohol use and a higher number of heavy drinking occasions than females across all countries (Table 3). Perceived frequency of alcohol use and number of heavy drinking occasions of a typical student were associated with the corresponding personal alcohol use behavior (Table 3): For instance, compared to students who drank

alcohol monthly or less often, those who perceived the frequency of peer alcohol use to be higher (per one unit increase) were more likely to drink alcohol twice a week or more often (Slovak Republic: odds ratio (OR)=3.81, 95% confidence interval (CI)=2.51-5.79; Lithuania: OR=3.16, 95% CI=2.11-4.75; Hungary: OR=2.10, 95% CI=1.53-2.87) or drink alcohol two or more times a month (Slovak Republic: OR=1.62, 95% CI=1.28-2.05; Lithuania: OR=1.13, 95% CI=2.11-4.75; Hungary: OR=2.10, 95% CI=1.53-2.87) compared to monthly or less often. The perception of a high number of heavy drinking occasions of peers (per one unit increase) was associated with a higher likelihood to report heavy drinking weekly or more often (Slovak Republic: OR=3.16, 95% CI=1.92-5.20; Lithuania: OR=3.56, 95% CI=2.14-5.94; Hungary: OR=1.41, 95% CI=0.79-2.51) compared to less than monthly (Table 3).

Discussion:

The results of the current study showed that across all three participating countries, the majority of students perceived their peers as having a higher frequency of alcohol use and engaging in more heavy drinking occasions than themselves. Furthermore, we found associations between perceptions of alcohol use of a typical student and personal alcohol use.

Our findings, that a high proportion of students estimated the alcohol use behavior of a typical student to be higher than their own self-reported behavior, are consistent (Page et al., 2008) with findings of studies among University students in North-America (Borsari & Carey, 2003; Kypri & Langley, 2003) and Western Europe (Franca et al., 2010; McAlaney &

McMahon, 2007). Our findings are also consistent with findings in a study conducted among adolescents in Hungary, Slovak Republic, Czech Republic and Romania (Page et al., 2008) which supports the notion that this is a general pattern.

In agreement with a review by Borsari and Carey (2003) including several North-American studies, we found greater self-other discrepancies among female students in this Central and East European sample. In previous research, greater misperceptions of female students have been attributed to several factors. Female students have been noted to have lower personal alcohol use compared to their male counterparts, and therefore less direct experience of the alcohol consumption culture of their institution. In addition drinking in mixed sex peer groups is common among female students, and as such their perception of the norm may be influenced by the alcohol consumption behavior of their male drinking partners (Berkowitz, 2004; Borsari & Carey, 2003). Moreover, our findings show that perceived behavior of a typical student is significantly associated with both frequency of alcohol use and number of heavy drinking occasions, which is also consistent with previous research among University students (McAlaney & McMahon, 2007; Neighbors, Lee, Lewis, Fossos, & Larimer, 2007; Perkins, 2007), adolescents (Page et al., 2008) and vocational school students (Haug, Ulbricht, Hanke, Meyer, & John, 2011) in this field.

The findings from this study may be relevant to the future design of prevention strategies in Central and East Europe to reduce alcohol use among students. To include gender-specific social norms messages can be considered for prevention in the same way as it has been tested in North America (Perkins, 2014). Several studies already used gender-specific feedback which was found to be more effective to reduce alcohol use in students

(Neighbors et al., 2010) or at least in sub-groups such as female students (Lewis & Neighbors, 2007). Moreover, a qualitative study conducted among University students from the Slovak Republic showed that students preferred interactive prevention approaches that directly involve students (Salonna, Vendelová, Benka, & Bačíková, 2012). Therefore, the communication strategy of social norms messages should be carefully considered, possibly by giving feedback to small groups of students or using the web to deliver individual normative feedback messages instead of mass media campaigns.

The strength of the present study is the large sample of students from eight universities in three Central and Eastern European countries. The SLiCE study is the first to report perceptions of alcohol use among University students of different Central and East European countries.

However, the observed substance use rates may not be representative for University students in the three participating countries or even for the universities that participated in this study. We cannot guarantee that we reached all students from all faculties and study programmes. Furthermore, we could not determine the response rates as we do not know how many students participated in lectures where the study was presented, or received study information. While we had access to email distribution lists for some of the universities, we are not sure how many students actually use their official accounts on a regular basis. In addition, the self-selecting nature of participation in the survey may have created a non-representative sample by disproportionally attracting students with a higher or lower level of alcohol consumption. This bias is possibly reduced by the fact that the alcohol use questions were part of a multi-theme questionnaire and not a specific study to assess alcohol related behavior and norms.

Furthermore, we relied on self-reported data and hence under- or over-reporting bias cannot be ruled out. On the other hand, substance use data for our study was collected via a confidential online survey, an approach which has been found to be a reliable means to examine alcohol use in computer literate populations such as students (Kypri, Gallagher, & Cashell-Smith, 2004). Since heavy drinking was defined as six drinks or more for both female and male students, this is more than the numbers defined in other studies and also not sexspecific (e.g. Wechsler, Dowdall, Davenport, & Rimm, 1995). This possibly resulted in somewhat lower estimate of heavy drinking among males, and particularly females, compared with other studies.

A further potential limitation is the use of a typical student as the reference group. This definition of norms behavior is based upon the assumption that a single culture exists at a University, with an equal identification role model. However, University students are a heterogeneous group with differences in values, beliefs and lifestyles (Cho, 2006). Therefore, according to Borsari & Carey (2001, 2003), the use of a distal reference group may lead to an inflated norm. Substance use behavior of proximal reference groups like (close) friends may be more relevant for students. However, we decided to use 'typical student' as the reference, since it is the most common reference used in previous research (Haug et al., 2011; Neighbors et al., 2007). Finally, our analysis is based on cross-sectional data. We therefore can only assume that perceptions are the cause of behavior, rather than behavior being the cause of perceptions. This hypothesis is supported by findings of a longitudinal study which indicated that a temporal relationship exists between perceived norms and later drinking (Neighbors et al., 2006).

Conclusion/Importance:

In conclusion, our study showed self-other discrepancies between personal and perceived frequency of alcohol use and heavy drinking occasions of a typical student among freshman University students at several Universities in the Slovak Republic, Lithuania and Hungary. The majority of the students estimated the alcohol use behavior of a typical student to be higher than their own personal behavior. In agreement with previous research in this field, this study also indicates that misperceived norms of peer alcohol use are a relevant predictor of personal use. This is the first study to report such associations among University students of different Central and East European countries.

Social norms-interventions may be effective in reducing alcohol use among Central and East European student populations by challenging discrepancies between perceived peer alcohol use and personal use. Hence, future research should evaluate the feasibility of such intervention strategies. Further, our findings may have relevance to the design of social norms-interventions: Larger self-other discrepancies among female students lead to the suggestion that gender-specific messages may be required to optimize social normsinterventions.

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Glossary:

Frequency of alcohol use: Number of occasions one is having a drink containing alcohol.

Heavy drinking: Having six or more drinks on one drinking occasion.

Perceptions of alcohol use: Alcohol use of a typical student at the own university. Social norms-interventions: Challenging misperceptions of risk behavior and correcting the perceived norm. This is based on the premise that this will reduce the social influence on the individual to use these substances.

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