

Alcohol

Alcohol-related adverse consequences: cross-cultural variations in attribution process among young adults

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Background: Social norms around what is culturally accepted in terms of alcohol consumption and drunken comportment appear important regarding the acceptance of alcohol-related adverse consequences; however, investigations often neglect to consider differences in terms of attribution. This study aims at assessing cross-cultural differences in the reporting of alcohol-related adverse consequences. It also considers differences across consequences that might explain which type of consequences (mainly acute or mainly chronic) are most affected by an attribution process. **Methods:** Conditional regression models were estimated based on data from eight European countries participating in the Gender, Alcohol and Culture—An International Study (GENACIS) project. Cases were matched to controls based on usual drinking patterns in order to control for average volume of alcohol and frequency of ‘risky single occasion drinking’ (RSOD). **Results:** Differences among the patterns of associations between countries and consequences were evident. The distinction between Nordic and other European countries was persistent. A higher variability of associations was observed for some consequences, namely the mainly acute instances. Finally, the Isle of Man and Switzerland showed specific trends with associations across consequences. **Conclusion:** Reporting of alcohol-related adverse consequences seemed strongly affected by cultural norms. The latter may be exemplified by viewing drinking as ‘time-out’ behaviour. Respondents in countries with a stereotypical history of being ‘dry’ or with a stereotyped ‘binge’ drinking culture were more likely to attribute consequences to their alcohol consumption than people in ‘wet’ countries. This was particularly true for consequences that related to episodic ‘time-out’ heavy drinking.

Keywords: alcohol-related adverse consequences, conditional matching, cross-cultural variations, drinking patterns, Europe, GENACIS

Introduction

Mac Andrew and Edgerton,¹ argued in their landmark study that the way people behave when under the influence of alcohol is determined by what is viewed as acceptable in their society rather than drunken comportment being a function of toxically uninhibited brains. Drunken comportment is then conceptualized as a ‘time out’ behaviour for which a ‘within limits’ clause operates according to a set of norms that can differ from society to society.² Differences in socially acceptable behaviours have been attributed to the ‘wetness’ of a culture.³ Although there is no clear and universally accepted definition of ‘wetness’,³ a predominant drinking pattern of frequent consumption of moderate amounts of alcohol, i.e. alcohol use integrated into everyday life, is typically characterized as ‘wet’, whereas patterns of infrequent but recurrently heavy drinking are characterized as ‘dry’. A greater acceptance of drunken comportment is expected in a dry culture, where alcohol consumption is an infrequent ‘time-out’ behaviour, thus affecting the potential attribution process of the consequences of alcohol consumption.

Comparative studies on alcohol have underlined large variation in the distribution of drinking patterns across countries.^{4,5} Room and Mäkelä³ distinguished four ideal types of cultural positions of drinking, i.e. abstinent societies, constrained ritual drinking, banalized drinking and fiesta drunkenness. Furthermore, Room² suggested that drinking plays different roles regarding the development of alcohol-related consequences depending on the position of drinking in a culture and the expectations about drunken behaviours.

The threshold of what can be socially tolerated may also influence the perception of what is viewed as ‘problematic behaviour’. For this reason, the interaction effects between individual drinking patterns, subjective perceptions and cultural norms could influence the reporting of alcohol-related consequences. Only a few studies have considered the effects of cultural variations on the experience of alcohol-related adverse consequences for peoples with similar drinking patterns. Cherpitel *et al.*^{6,7} have reported a link between acute consumption and the attribution of alcohol consumption to the injury and suggest that attribution was modified by cultural drinking patterns. Our study empirically analyses whether reporting of different alcohol-related adverse consequences was not only influenced by consumption but also had a strong cultural component through attribution process.

The present study examined comparable survey data that was elicited in eight countries as part of *Gender, Alcohol and Culture—An International Study* (GENACIS). This investigation aimed at assessing cross-cultural differences in the reporting of alcohol-related adverse consequences by holding the drinking patterns constant. It also considered differences across consequences that might explain, which type of adverse consequences (mainly acute or mainly chronic) may be most affected by the attribution process.

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Table 1 Survey characteristics and final sample size by age and gender among drinkers (people aged between 18 and 25)

Country	Survey year	Survey mode	N			Drinkers (%) (weighted) (original sample)
			men	women	total	
Finland	2000	face-to-face ^a	103	135	238	95.0
Sweden	2002	telephone	95	119	214	90.4
Iceland	2001	mixed ^b	164	210	374	88.5
Isle of Man	2005	mixed ^c	25	35	60	95.0
Hungary	2001	face-to-face ^a	153	143	296	91.1
Czech Republic	2002	face-to-face	187	202	389	86.1
The Netherlands	1999	postal	224	231	455	77.8
Switzerland	1997	telephone	504	556	1060	82.1

a: parts are self-administered

b: postal/telephone

c: half face-to-face/telephone

Methods

Study design and sample

The present study is part of a GENACIS sub-project of 14 European countries. It uses a centralized data bank management of encoded questions that followed similar concepts and measures using identical rules to achieve the greatest comparability. Unfortunately, many European countries involved in the GENACIS project did not utilize the core questionnaire and inclusion of countries in this study depended on data availability. Only eight countries responded to our inclusion criteria of having complete information on drinking patterns and consequences: the three Nordic countries of Finland, Sweden and Iceland; the Isle of Man (fourth non-continental country); three Central Europe countries including The Netherlands, Czech Republic and Hungary; and Switzerland. Regrettably, no Mediterranean country met the inclusion criteria, but Switzerland has repeatedly been considered as having a Mediterranean drinking culture with predominant wine consumption, large national wine production and important cultural and historical Latin influence. Switzerland is thus considered here as a proxy for the Mediterranean drinking culture. Seven surveys were nationally representative. The exception was the Netherlands (regional sample from Limburg). An overview of the surveys characteristics is presented in table 1. The present study focused on people aged between 18 and 24 years, an age group for which the prevalence of heavy drinking episodes is highest in most cultures.⁸

Previous research, such as the European Comparative Alcohol Study (ECAS), has underlined that drinking cultures vary across Europe, and has commonly distinguished Nordic, Central and Mediterranean Europe when reporting results.⁹ According to the wet/dry typology, Nordic countries are often classified as 'dry', whereas Mediterranean countries are classified as 'wet'. Nevertheless, as reported by Room and Mäkelä,³ a convergence in drinking cultures in Europe has been observed within the last decades, making the distinction between wet and dry countries even more problematic. For this reason the present study reports results according to geographical criteria, even if some of the points discussed subsequently refer to the traditional wet/dry distinction.

Measures

Conditional matching on average volume of drinking and risky single occasion drinking

Average volumes of drinking and heavy drinking episodes [also called 'binge drinking' or 'risky single occasion drinking' (RSOD) an expression preferred here] are the most important

predictors of the consequences of drinking. Both have been shown as independently predictive of negative consequences.^{10,11} Evidence of interaction between these dimensions of drinking patterns has been reported.^{12,13} Alcohol consumption in terms of volume of drinking may lead to adverse chronic consequences.¹⁴ Research has demonstrated that episodes of heavy drinking, in addition to volume of drinking, are important determinants of social and acute consequences such as injuries.^{14,15} To consider these dimensions without examining their interaction would be insufficient to control for drinking patterns as reported in a recent study on injuries.¹⁶

This study sought to account for both main and interaction effects. It combined both dimensions and matched individual's reporting (cases) and non-reporting (controls) alcohol-related consequences based on this combination of dimensions of drinking patterns. This was done to disaggregate the effects of drinking patterns on experiencing alcohol-related adverse consequences from effects that were associated with subjective (individual) and/or cultural variations.

Average volume of alcohol (in g) consumed per day was divided into three levels of drinking: (i) <10 g of absolute alcohol; (ii) at least 10 but <20 g; (iii) 20 or more grams per day. 'RSOD' was defined by the annual frequency of drinking high amounts of alcohol (e.g. five drinks or 60 g or more) on a single occasion. It was recoded into a categorical variable with four levels of frequency: (i) no RSOD; (ii) less than monthly; (iii) about once a month and (iv) more than once a month. Finally, both dimensions were crossed resulting in 12 groups of drinkers (3 volume times 4 RSOD groups) used for matching.

Differences in types of measurement, in measurement scales, e.g. four point versus six point scales, in recall period, or in cut-offs used, exist across the surveys; implying potential bias in the corresponding prevalence (table 2). An overview of the drinking indicators and how they were measured can be found in table 2. As suggested by Graham *et al.*,¹⁷ using different cut offs for RSOD for women and men is highly relevant due to biological differences. Nevertheless, most of the datasets analysed here did not provide such an opportunity for distinction.

Dependent variables—alcohol-related adverse consequences

Five different items were selected. These represented a broad perspective of alcohol-related adverse consequences that ranged from mainly acute consequences to mainly chronic ones. The following consequences were examined: (i) *injury*, i.e. *Have you or someone else been injured as a result of your drinking?*; (ii) *blackout*, i.e. *How often during the last 12 months have you been unable to remember what happened the night before because you had been drinking?*; (iii) *feelings of*

Table 2 Characteristics of drinking measures and distribution of drinking patterns (average volume of drinking, on a daily basis and annual frequency of RSOD) among drinkers by country

	Characteristics of drinking measures		Average volume of alcohol consumed			Frequency of RSOD (last 12 months)				Total n ^b
	Type of measurement ^a / recall period for volume of alcohol	Cut-offs for RSOD U/g	Less than 10 g/day	10 g/day to <20 g/day	20 g/day or more	No	Less than monthly	About once a month	More than once a month	
Finland	BS/12 months	6+/60	67.0	22.6	10.4	10.4	39.6	37.7	12.3	212
Sweden	G/12 months	6+/72	78.1	17.2	4.7	19.8	27.6	9.9	42.7	192
Iceland	BS/12 months	5+/65	65.8	20.3	13.9	9.5	31.0	19.0	40.5	316
Isle of Man	G/12 months	8+/64	53.6	8.9	37.5	21.4	57.1	0.0	21.4	56
Hungary	BS/mixed ^c	3+/60	88.5	7.8	3.7	32.3	25.7	12.6	29.4	269
Czech Republic	BS/12 months	5+/90	56.9	17.1	26.0	30.2	48.2	14.1	7.5	334
The Netherlands	G/12 months	6+/60	58.6	17.5	24.0	25.7	21.6	10.9	41.7	338
Switzerland	BS/mixed ^c	8+/80	66.9	20.8	12.3	56.3	32.9	8.9	1.9	852

a: type of measurement: BS, Beverage specific; G, Generic

b: respondent with missing information on drinking patterns or other variables included in the models excluded

c: uses a mixture (e.g. if existent 30 days; else 12 months)

Table 3 Distribution of alcohol-related adverse consequences among drinkers by country

	Injury		Blackout		Remorse		Role failure		Loss of control over drinking	
	Percentage	n (total)	Percentage	n (total)	Percentage	n (total)	Percentage	n (total)	Percentage	n (total)
Finland	10.0	211	49.5	212	51.7	211	24.1	212	18.9	212
Sweden	7.3	192	31.9	191	21.4	192	25.7	191	11.1	190
Iceland	8.9	293	46.8	293	48.8	293	29.1	292	22.3	292
Isle of Man	9.1	55	44.6	56	26.8	56	12.5	56	8.9	56
Hungary	1.1	268	7.3	261	13.0	261	5.4	261	5.8	260
Czech Republic	3.1	322	26.6	334	30.0	333	21.9	334	5.1	332
The Netherlands	3.0	338	21.6	338	10.9	338	#	–	4.4	338
Switzerland	0.6	852	14.0	852	7.9	852	16.5	851	9.3	852

#: not surveyed

remorse, i.e. *How often during the last 12 months have you had a feeling of guilt or remorse after drinking?*; (iv) *role failure*, i.e. *How often during the last 12 months have you failed to do what was normally expected from you because of drinking?* (not examined in the Netherlands) and (v) *loss of control over drinking*, i.e. *How often during the last 12 months have you found that you were not able to stop drinking once you had started?* The first two consequences, i.e. *injury* and *blackout*, were considered as more strongly related to an acute heavy alcohol use, whereas *role failure* and *loss of control over drinking* were considered as related more to a chronic use. The *remorse* item was considered as in-between this continuum. These items stemmed from the Alcohol Use Disorders Identification Test (AUDIT) questionnaire, and were originally selected for their ability to discriminate hazardous drinkers and on the basis of face validity, clinical relevance and the coverage of significant conceptual domains of alcohol-related adverse consequences.¹⁸ All items were recoded into binary outcomes, distinguishing between people who did or did not encounter the consequences during the last 12 months.

Control variables—demographical factors

Individual factors such as gender,^{19,20} age¹⁰ or socio-economic status²¹ e.g. have been shown to moderate the association between drinking and alcohol-related adverse consequences. Therefore, the following variables were controlled for: gender (men as reference);^{22,23} age as a continuous variable¹⁰ and employment/activity status.^{24–26}

Statistical analyses

Matched case-control analyses were run using the combination of both aforementioned dimensions of drinking patterns

(12 groups) through the matched-group-variable method.²⁷ Conditional logistic regression fitted models appropriate for the matching design by using the true conditional likelihood and not an approximation of it.²⁷ Parameters can be interpreted similarly to unmatched analysis.²⁸ For each outcome, a conditional logistic regression model was examined. The country with the lowest association with a specific outcome was set as the reference country; resulting in odds ratios greater than 1 for all other countries. Regression models were estimated using the Stata 9.1 statistical software package and Pseudo R² are reported as approximation of the explained variance for each outcome.

Results

Distribution of alcohol-related adverse consequences across countries

Across consequences (table 3), *injury* showed commonly the lowest prevalence across countries, whereas *blackout* and *remorse* showed commonly the highest ones (up to 50% of drinkers).

General cultural differences in experiencing consequences

Table 4 gives the results from the conditional logistic regression models on the five alcohol-related adverse consequences. For the two mainly acute consequences, namely *injury* and *blackout*, a clear distinction appeared between continental and non-continental European countries with Finland, Iceland, Sweden and the Isle of Man showing significant and clearly higher associations when compared with the remaining countries.

Table 4 Results from conditional logistic regression models on the five alcohol-related adverse consequences; Odds Ratios, 95% Confidence Interval in brackets and Pseudo R^2 by consequences

	Injury	Blackout	Remorse	Role failure	Loss of control over drinking
Finland	11.46*** (3.91; 33.58)	11.49*** (6.38; 20.68)	11.18*** (6.88; 18.18)	4.34*** (2.25; 8.37)	6.91*** (3.52; 13.57)
Iceland	8.28*** (2.79; 24.62)	9.06*** (5.20; 15.79)	8.70*** (5.59; 13.56)	4.86*** (2.62; 9.03)	6.99*** (3.78; 12.93)
Sweden	8.09*** (2.51; 26.14)	5.66*** (3.14; 10.20)	2.51** (1.48; 4.25)	5.02*** (2.63; 9.58)	3.59** (1.72; 7.47)
Isle of Man	9.56** (2.43; 37.51)	11.96*** (5.38; 26.57)	4.09*** (1.94; 8.61)	1.76 (.64; 4.84)	2.73 (.90; 8.30)
Czech Republic	3.00 (.98; 9.14)	5.09*** (2.81; 9.23)	5.88*** (3.66; 9.45)	4.32*** (2.25; 8.32)	1.79 (.84; 3.84)
The Netherlands	2.19 (.66; 7.26)	2.33** (1.31; 4.16)	1.00 –	# –	1.00 –
Hungary	1.34 (.29; 6.19)	1.00 –	1.81* (1.05; 3.10)	1.00 –	2.28* (1.05; 4.97)
Switzerland	1.00 –	3.67*** (2.07; 6.51)	1.68* (1.03; 2.75)	5.32*** (2.83; 9.97)	5.80*** (3.02; 11.15)
Pseudo R^2	0.103	0.073	0.112	0.032	0.056

*significance at 5%, **significance at 1%, ***significance at 0.1%
#: not surveyed

For *remorse*, a different trend was discovered. Non-continental countries showed commonly the highest estimates, but the Czech Republic joined this group of countries with even higher estimates than the Isle of Man and Sweden.

For the two mainly chronic adverse consequences, i.e. *role failure* and *loss of control over drinking*, a new dichotomy appeared. Switzerland showed for both estimates higher than or close to the ones of the Nordic countries. Conversely, the Isle of Man showed low and non-significant estimates close to those of other continental countries. As for *remorse*, the Czech Republic showed a high estimate for *role failure*, similar to those found for Switzerland and the Nordic countries.

With regard to country-specific trends across consequences, five distinct patterns arose. First, estimates for the Nordic countries were, with one exception (*remorse* for Sweden), always among the highest estimates. Second, Switzerland showed low or moderate estimates for the mainly acute consequences, i.e. *injury* and *blackout*, as well as for *remorse*, but among the highest estimates for the mainly chronic ones, i.e. *role failure* and *loss of control over drinking*. Third, and in opposition to Switzerland, Isle of Man showed very high estimates (OR close or higher than 10) with regard to *injury* and *blackout*, relatively high or medium estimate for *remorse* and low estimates for the mostly chronic consequences, i.e. *role failure* and *loss of control over drinking*. Fourth, relative to other countries, the Czech Republic showed estimates varying from low to medium strength (always inferior to the ones of Nordic countries). Finally, Hungary and the Netherlands consistently showed low estimates.

Alcohol-related adverse consequences: differences and explanatory power

Regarding the relative strength of estimates and explanatory power of the models, a consistent dichotomy between two groups of consequences was evident. First, *remorse* and the two mainly acute consequences, i.e. *injury* and *blackout*, showed the largest country differences with odds ratios greater than 11. Conversely, the two mostly chronic consequences, i.e. *role failure* and *loss of control over drinking*, showed the lowest country differences. Similarly, the estimated models for these consequences resulted in lower levels of explained variance.

Discussion

After controlling for the two main dimensions of drinking patterns, i.e. average volume of alcohol consumed and the frequency of RSOD, through matched case-control analysis, clear and consistent differences in patterns of 'associations' between countries and consequences arose. The most marked difference concerned the distinction between Nordic and other

European countries. This may be interpreted to mean that attribution processes had a different relevance in different countries. The authors see few reasons why reporting alcohol-related adverse consequences should vary so markedly across countries. For most of the consequences considered here, the occurrence of consequences should be determined mainly by neuropsychological effects, e.g. by impairing cognitive and psychomotor aptitudes.^{29,30} Apart from differences related to mean body weights across countries,³¹ these effects should be consistent across cultures. Attribution processes appeared thus to be influenced by the cultural position regarding drinking.

To support this hypothesis, the distinction between 'dry' and 'wet' culture has frequently been used in the literature when attempting to describe cultural differences in drinking patterns.^{3,4,32} Dry countries were traditionally described as nations with infrequent but very heavy episodes of drinking. Nordic countries were often used to exemplify 'dry' cultures whereas Mediterranean countries commonly represented the so-called 'wet' culture, with alcohol consumption being integrated into every day life. As reported by Room and Mäkalä,³ studies have underlined that, for a given pattern of drinking, adverse consequences were more often reported in drier than in wetter regions see as well.³³ Room² has additionally suggested that drinking plays different roles in relation to the development of alcohol-related consequences and has, for example, a stronger role in violence within 'drier' than in 'wetter' cultures. It has been reported that there is a convergence in drinking cultures in Europe³ and, consequently, a diminished wet/dry country distinction. The results reported here suggest that such differences between traditionally dry countries, i.e. Nordic countries, and other countries still exist. These findings also support the view of Room,² who hypothesized that even after a shift from a 'dry' to a 'wetter' cultural positioning of alcohol in Europe, changes in cultural expectations about drunken comportment are very unlikely. Accordingly, the 'time-out' hypothesis seems robust.

The impact of cultural attribution processes can also be seen in the variability of the magnitude of effects across consequences. A higher variability was observed for the mostly acute consequences, namely *injuries* and *blackout*. Consistent with the 'time-out' hypothesis,² differences between countries were higher for the consequences that are associated with RSOD than for consequences that are related to alcohol use problems and dependence, such as *role failure* or the *loss of control over drinking*. Regression models for consequences associated with drinking problems and, indirectly, with alcohol use disorders had a limited explanatory power. This suggests that the reporting of such consequences was less affected by cultural attribution processes. These consequences may be more or less perceived as problematic in most cultures, independent of the cultural position of drinking in the society.

Another interesting finding concerns the Isle of Man and Switzerland, which showed very specific trends across consequences, i.e. high associations with the mostly acute consequences but rather weak associations with the mostly chronic ones, or inversely (Switzerland). Accordingly, specific attribution processes appear to vary across consequences for particular countries. This suggests that intra-cultural variations exist concerning what kind of alcohol-related adverse consequences can be tolerated, perhaps depending on their nature and the degree of disability. These findings are once more consistent with the view of Room,² who previously suggested the existence of a gradient of expectations about drunken behaviours. He has also discussed the potential fallacy of considering that a culture should have a unique set of norms covering a single and well-defined 'time-out' state.

Despite the fact that the GENACIS database provides a unique opportunity for comparative analysis, the comparability of findings across countries is limited by some factors. Study designs vary across countries (tables 1 and 2) and a degree of bias cannot be completely ruled out due to the use of different instruments across countries as highlighted by the peculiar distribution of RSOD in Finland compared with other Nordic countries. Taking this caveat into account, the present study warns against over-simplified comparison of prevalence rates in cross-cultural studies.

Also, situational factors, such as the context in which drinking takes place or the pace of drinking (e.g. drinking five units of alcohol over lunch and dinner or drinking these units over a short period of time without eating, results in marked differences in peak blood alcohol concentrations), could be considered as relevant as the two dimensions of drinking patterns considered here. It may be, for example, that individuals in Nordic countries attain a much higher peak blood level when reaching the RSOD cut-off, which could be an alternative explanation for the higher likelihood of consequences such as injuries and blackouts. Situational factors should thus be considered to properly rule out any residual confounding aspects when studying attribution processes. Our study aimed at demonstrating that any reporting of consequences might be influenced by social processes such as attribution of the consequences of drinking. The lack of beneficial consequences in the GENACIS dataset restricted our analyses to adverse consequences. Future studies should, therefore, use empirical testing of the observed attribution process with regard to beneficial consequences.

Many of the consequence items analysed form the basis for e.g. screening instruments. As noted by Abel and Plumridge³⁴ even although disinhibition is often viewed as the primary goal of drinking, the limits of what is acceptable behaviour may vary between groups. Furthermore, associations between alcohol consumption and sensation seeking behaviours,³⁵ and degrees of psychological distress³⁶ may have profound effects on how alcohol is perceived within and between different cultures. This suggests that there might be a need for more studies in order to investigate the cultural sensitivity of such instruments.

In our study, differences in the reporting of consequences could not be explained by differences in drinking alone, but—as we believe—are related to differential attribution processes. Reporting of adverse consequences, particularly those with the explicit mentioning of an alcohol contribution, appear to be affected by cultural norms such as alcohol consumption being perceived as 'time-out' behaviour. Countries with a stereotypical history of being 'dry' (Nordic countries) or with a stereotyped binge culture such as the Isle of Man, see e.g.^{37,38}, were more likely to attribute consequences to their alcohol consumption than 'wet' countries. This was particularly true for consequences

that were more related to acute, episodic, 'time out' heavy use than to chronic heavy use.

Acknowledgements

This study is part of the GENACIS project. GENACIS is a collaborative international project affiliated with the Kettl Bruun Society for Social and Epidemiological Research on Alcohol, and coordinated by GENACIS partners from the University of North Dakota, the University of Southern Denmark, the Charité University Medicine Berlin, the Pan American Health Organization and the Swiss Institute for the Prevention of Alcohol and Drug Problems. Support for aspects of the project comes from the World Health Organization, the Quality of Life and Management of Living Resources Programme of the European Commission (Concerted Action QLG4-CT-2001-0196), the U.S. National Institute on Alcohol Abuse and Alcoholism/National Institutes of Health (Grant Numbers R21 AA012941 and R01 AA015775), the German Federal Ministry of Health, the Pan American Health Organization and Swiss national funds. The analysis presented in this article was supported by a grant from the Alcohol and Health Research Trust (a charity) from the European Forum for Responsible Drinking (formerly known as the Amsterdam Group). Additional support was provided by the University of the West of England, Bristol. Support for individual country surveys was provided by government agencies and other national sources. The study leaders and funding sources for datasets used in this study are: Ladislav Csémy, The Czech Republic, The Ministry of Health of the Czech Republic (grant MZ 23752); Salme Ahlström, Finland, National Research and Development Centre for Welfare and Health (STAKES); Zsuzsanna Elekes, Hungary, The Ministry of Youth and Sports; Hildigunnur Ólafsdóttir, Iceland, Alcohol and Drug Abuse Prevention Council, Public Health Institute of Iceland; Martin Plant and Moira Plant, Isle of Man, Isle of Man Medical Research, University of the West of England, Bristol; Ronald Knibbe, The Netherlands, Ministry of Health and Welfare of the Netherlands; Karin Helmersson Bergmark, Sweden, The Swedish Ministry of Health and Social Affairs; Gerhard Gmel, Switzerland, The Swiss Federal Office for Education and Science (contract 01.0366).

Conflicts of interest: None declared.

Key points

- Investigations on alcohol-related adverse consequences often neglect to consider differences in terms of attribution.
- Reporting of alcohol-related adverse consequences seemed to be strongly affected by cultural norms and attribution process.
- Consequences that are more related to episodic 'time-out' heavy drinking appear to be particularly affected by these phenomena.

References

- 1 MacAndrew C, Edgerton RB. *Drunken comportment: a social explanation*. Chicago, IL: Aldine, 1969.
- 2 Room R. Intoxication and bad behaviour: understanding cultural differences in the link. *Soc Sci Med* 2001;53(2): 189–98.
- 3 Room R, Mäkelä K. Typologies of the cultural position of drinking. *J Stud Alcohol* 2000;61(3): 475–83.
- 4 Pitman DJ, Raskin-White H. *Society, culture and drinking patterns re-examined*. New Brunswick, NJ: Rutgers Center of Alcohol Studies, 1991.

- 5 Mäkelä P, Gmel G, Grittner U, et al. Drinking patterns and their gender differences in Europe. *Alcohol Alcohol* 2006;41(Suppl 1): i8–i18.
- 6 Cherpitel CJ, Ye Y, Bond J, Borges GLG. The causal attribution of injury to alcohol consumption: a cross-national meta-analysis from the emergency room collaborative alcohol analysis project. *Alcohol Clin Exp Res* 2003;27(11): 1805–12.
- 7 Cherpitel CJ, Bond J, Ye Y, et al. Multi-level analysis of causal attribution of injury to alcohol and modifying effects: data from two international emergency room projects. *Drug Alcohol Depend* 2006;82(3): 258–68.
- 8 Kuntsche EN, Rehm J, Gmel G. Characteristics of binge drinkers in Europe. *Soc Sci Med* 2004;59(1): 113–27.
- 9 Hemström Ö, Leifman H, Ramstedt M. The ECAS-survey on drinking patterns and alcohol-related problems. In: Norström T, editor. *Alcohol in postwar Europe: consumption, drinking patterns, consequences and policy responses in 15 European Countries*. Stockholm: Almquist and Wiksell International, 2002, 125–36.
- 10 Mäkelä K, Mustonen H. Relationships of drinking behaviour, gender and age with reported negative and positive experiences related to drinking. *Addiction* 2000;95(5): 727–36.
- 11 Mustonen H, Mäkelä K. Relationships between characteristics of drinking occasions and negative and positive experiences related to drinking. *Drug Alcohol Depend* 1999;56(1): 79–84.
- 12 Single E, Leino EV. The levels, patterns, and consequences of drinking. In: Grant M, Litvak J, editors. *Drinking patterns and their consequences*. Washington, DC: Taylor & Francis, 1998, 7–24.
- 13 Rehm J, Gmel G. Aggregating dimensions of alcohol consumption to predict medical and social consequences. *J Subst Abuse* 2000;12(1–2): 155–68.
- 14 Rehm J, Room R, Monteiro MG, et al. Alcohol use. In: Ezzati M, Lopez AD, Rodgers A, Murray CJL, editors. *Comparative quantification of health risks global and regional burden of disease attributable to selected major risk factors*. Geneva: World Health Organization (WHO), 2004, 959–1108.
- 15 Rehm J, Gmel G. Patterns of alcohol consumption and social consequences. Results from an 8-year follow-up study in Switzerland. *Addiction* 1999;94(6): 899–912.
- 16 Gmel G, Bissery A, Gammeter R, et al. Alcohol-attributable injuries in admissions to a Swiss emergency room - an analysis of the link between volume of drinking, drinking patterns and preattendance drinking. *Alcohol Clin Exp Res* 2006;30(3): 501–9.
- 17 Graham K, Wilsnack RW, Dawson DA, Vogeltanz-Holm ND. Should alcohol consumption measures be adjusted for gender differences? *Addiction* 1998;93(8): 1137–47.
- 18 Babor TF, Higgings-Biddle JC, Saunders JB, Monteiro MG. Audit - The Alcohol Use Disorders Identification Test: guidelines for use in primary care. In: World Health Organization (WHO) DoHaSD, editor. *Screening and brief intervention: for alcohol problems in primary care*. Geneva: WHO, 2001.
- 19 Plant ML. *Women and alcohol: contemporary and historical perspectives*. London, UK: Free Association Books, 1997.
- 20 Wilsnack RW, Vogeltanz-Holm ND, Wilsnack SC, et al. Gender differences in alcohol consumption and adverse drinking consequences: cross-cultural patterns. *Addiction* 2000;95(2): 251–65.
- 21 Casswell S, Pledger M, Hooper R. Socioeconomic status and drinking patterns in young adults. *Addiction* 2003;98(5): 601–10.
- 22 Ely M, Hardy R, Longford NT, Wadsworth ME. Gender differences in the relationship between alcohol consumption and drink problems are largely accounted for by body water. *Alcohol Alcohol* 1999;34(6): 894–902.
- 23 Bongers IMB, van de Goor LA, van Oers JA, Garretsen HF. Gender differences in alcohol-related problems: controlling for drinking behaviour. *Addiction* 1998;93(3): 411–21.
- 24 Janlert U, Hammarström A. Alcohol consumption among unemployed youths: results from a prospective study. *Br J Addict* 1992;87(5): 703–14.
- 25 Hammarström A. Health consequences of youth unemployment - review from a gender perspective. *Soc Sci Med* 1994;38(5): 699–709.
- 26 Hammarström A. Health consequences of youth unemployment. *Public Health* 1994;108(6): 403–12.
- 27 StataCorp. *Stata Statistical Software: Release 9*. College Station, TX: Stata Press, 2005.
- 28 Schlesselman JJ. *Case control studies: design, conduct, analysis*. NY: Oxford University Press, 1982.
- 29 Ogden EJD, Moskowitz H. Effects of alcohol and other drugs on driver performance. *Traffic Inj Prev* 2004;5(3): 185–98.
- 30 Eckardt MJ, File SE, Gessa GL, et al. Effects of moderate alcohol consumption on the central nervous system. *Alcohol Clin Exp Res* 1998;22(5): 998–1040.
- 31 Kiefer F, Spanagel R. Measuring alcohol consumption in man - it' time for a change. *Addiction* 2006;101(8): 1215–6; author reply 6–7.
- 32 Heath DB. *International handbook on alcohol and culture*. Westport, CT: Greenwood Press, 1995.
- 33 Cahalan D, Room R. Problem drinking among American men aged 21–59. *Am J Public Health* 1972;62(11): 1473–82.
- 34 Abel GM, Plumridge EW. Network “norms” or “styles” of “drunken comportment?” *Health Educ Res* 2004;19(5): 492–500.
- 35 Hittner JB, Swickert R. Sensation seeking and alcohol use: a meta-analytic review. *Addict Behav* 2006;31(8): 1383–401.
- 36 Cable N, Sacker A. The role of adolescent social disinhibition expectancies in moderating the relationship between psychological distress and alcohol use and misuse. *Addict Behav* 2007;32(2): 282–95.
- 37 Powell JL, Steriu A, Plant MA, Miller P. Drinking, smoking and illicit drug use among 15 and 16 year olds in the Isle of Man. *J Subst Use* 2006;111–9.
- 38 Plant ML, Miller P, Plant MA, et al. Drinking patterns and alcohol-related experiences amongst adults on the Isle of Man: a comparison with the United Kingdom. *J Subst Use* 2007;4243–52.

Received 4 October 2007, accepted 25 January 2008