

# A comparison of substance use behaviours and normative beliefs in North-West European university and college students

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## Abstract

The social norms approach is an increasingly popular intervention for substance use that has been used extensively in the American college system. It operates by correcting normative misperceptions individuals hold about their peers. However, there have been few direct comparisons of substance use misperceptions between student populations in different European countries. The current study sought to address this through use of a survey of substance use and normative beliefs at universities in five European countries. Students at each site were invited to take part in an online survey that included items on personal substance use and the perceived use of peers. A total sample of 6404 students was obtained. Mann-Whitney and  $\chi^2$  analysis were used to demonstrate an apparent misperception effect, with the majority of students at each site significantly ( $p < 0.05$ ) overestimating the substance

use of their peers. This study suggests that students in Europe are prone to misperceiving the substance use of their peers in a manner similar to their American college counterparts, despite the cultural and legislative differences between these settings. This provides support for the potential in using social norms approaches to reduce rates of harmful substance use in European student populations.

**Keywords:** alcohol; drug use; smoking; social norms; students.

## Introduction

The social norms approach has become an increasingly popular method of reducing rates of alcohol and drug use, particularly in adolescent and student populations (1). It originates from a study in the American college system, in which it was noted that students tended to overestimate how heavily and frequently their peers drank alcohol (2). Similar misperceptions have now been documented at numerous college sites in the USA (3, 4) and also in student and adolescent populations in Scotland (5), England (6), Australia (7), New Zealand (8), Finland (9) Hungary, Slovakia, Romania, the Czech Republic (10), and France (11). The social norms approach aims to change behaviour by correcting these misperceptions through the use of a variety of mass media campaigns and personal feedback. It has been used extensively and successfully in the US, such as at the University of Virginia (12), and has also been incorporated into recent European initiatives, such as the European Drug Addiction Prevention (EU-DAP) project (13). The approach was the subject of a recent systematic review, which concluded that it could be an effective method for reducing alcohol use in student populations; however, the review also highlighted the need for more high quality controlled trials (14).

In order for this approach to be utilised effectively, it is necessary to demonstrate that there exist misperceptions within a population on which the approach would be applied. It could be argued that one of the current limitations of the field is the lack of studies that make cross-cultural comparisons of misperceptions and identify their association to individual behaviour. Whilst there is a growing number of social norms studies taking place in Europe and Australia, there are few that directly examine differences in normative misperceptions between countries. By looking at the existing literature, it would appear that some differences do exist. In contrast to the research from the USA, for example, both McAlaney and McMahon (5) and Page et al. (10) found no evidence for the differences in gender normally noted in American college students, where females tend to have greater misperceptions than

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males (4). Furthermore, both McAlaney and McMahon (5) in the UK and Hughes et al. (7) in Australia observed that perceived frequency of drunkenness in peers appeared to be a particularly influential and markedly misperceived social norm in young adults.

In addition to the differences in degree of misperception, it is also necessary to better understand the relative importance of social norms in predicting personal substance use. Work in North America on student alcohol use (15) has suggested that the perceived norm of a behaviour can be a more powerful determinant of that behaviour than many demographic factors, including gender, age, and residence. The aforementioned research in Europe has provided evidence that misperceptions are present amongst European university students, however no study has yet examined the relative importance of these misperceptions in predicting behaviour. One of the most notable differences in alcohol use between the USA and Europe is the age at which alcohol can be legally purchased; this is 21 years of age in the USA, but can be between 16–18 years in many parts of Europe. Furthermore, differences also exist in the legality and social acceptability of tobacco and recreational drug use. It is feasible that these differences in legislation and other cultural factors could influence the role of social norms in determining personal substance use. If this is the case, then this could have implications in adapting the social norms approach for use in European settings.

A greater understanding of the cultural differences in perceived norms is, therefore, important for the development of future social norms interventions. The current study sought to address this through the analysis of data from a larger study of student health behaviours at universities in Belgium, Denmark and the Netherlands; a medical university in Sweden; and a police college in Finland. The aims of the study were to i) establish if misperceptions of alcohol and other drug use are evident in students attending a range of European universities, ii) directly compare the extent of misperceptions between different European universities, and iii) examine the association between perceived alcohol and drug norms and personal use of these substances.

## Methods

Data was primarily collected from students using an online survey disseminated via email. This is a technique, which has been argued to be an effective data collection approach when studying computer-literate university students (16). In addition, data were collected at the University of Antwerp (Belgium) via a student health website associated with a separate health promotion project. Each survey was translated by one of the co-authors into the appropriate language for each site. Reminder emails were sent out approximately 1 week after the initial invitation; however, in each instance, the majority of responses were returned within 48 h of the survey being made available online.

## Measures

In keeping with the existing social norms literature (12), the questionnaire items used were simple ones that focused on key aspects of the target behaviours with categorical or ordinal variable response options, and which could also be translated easily between sites.

For alcohol consumption, respondents were asked to indicate how frequently in a month they consumed alcohol and how frequently they drank enough alcohol to feel drunk, using response options of not at all, once a month, two to three times a month, once a week, twice a week, 3–4 days a week, 5–6 days a week, and every day. Using the same response options, respondents were then asked to estimate the consumption of their peers (i.e., other students at the same university).

Participants were also asked to indicate through a simple yes or no response if they had smoked any cigarettes or used any recreational drugs in the last month, prompted with a list of examples of recreational drugs, such as cannabis (marijuana), ecstasy (mdma), coke (cocaine), heroine, or speed. They were then asked to rate what percentage of their peers they felt would have smoked or used recreational drugs in the past month, using response options that increased in 10% increments (e.g., 0%, 1%–9%, 10%–19%, 20%–29% and so on). Additional demographic data were also collected on age, gender, nationality (overseas or resident), and residence (living with peers or elsewhere).

## Statistical analyses

Gender differences in substance use were examined separately at each site using Mann-Whitney analysis for frequency of drinking and frequency of drunkenness and  $\chi^2$  analysis for smoking and recreational drug use. In order to establish if respondents held misperceptions about substance use at their university, a comparison was made between the reported norm for each behaviour at each university and the perceived norms reported by the individual respondent. The reported norm was calculated by ordering the response options from lowest/least frequent use to heaviest/most frequent use and then calculating the median value. This method of calculating the reported norm is consistent with the approach used in previous studies (15). Respondents who stated a perceived norm higher than the reported norm were classed as over-estimating. For example, a student who stated a perceived frequency of drinking of twice a week at a university, in which the reported norm was once a week, was considered to be over-estimating. Similarly students who stated a perception which matched the reported norm were classed as accurate, and those who stated a perception lower than the reported norm were classed as under-estimating.

Wilcoxon signed ranks tests were used to establish if there was a significant difference between the reported and perceived norms for each behaviour at each university, using the median values and misperception response options as outlined above. In light of the previously inconsistent research regarding gender effects on misperceptions, each analysis was conducted separately for male and female respondents at each site, with effect sizes calculated to indicate degree of misperception where present.

Binary logistic regression analysis was then used to examine the relative association between each item and personal substance use. For the purposes of this analysis, frequency of drinking and frequency of drunkenness were dichotomised into once a month or less often and two to three times a month or more often.

## Results

A total of 6404 surveys were returned. The highest response rate to the emailed surveys was at the Police College of Finland, where 66% of eligible students completed the questionnaire. This was followed by response rates of 33% at Karolinska Institutet, 26% at the University of Amsterdam,

and 13% at the University of Southern Denmark. A total of 659 surveys were returned from the University of Antwerp. However, since data were collected from this site through the use of a student website rather than an email survey, it was not possible to calculate a comparable response rate.

### Gender ratio and sample characteristics

The gender ratio of the sample obtained at each site was overall representative of the corresponding gender ratio of the student population, as shown in Table 1. However, it should also be noted that Karolinska Institutet has a high ratio of female students and that the Police College of Finland has a high ratio of male students. The potential effect of these ratios on the outcome of the analysis is discussed in greater detail in the Discussion section.

### Personal substance use

The personal reported substance use at each site is shown in Table 2.

### Gender differences in substance use

Males were found to drink significantly more frequently than females at Amsterdam ( $U=167,500$ ,  $z=-2.223$ ,  $p<0.05$ ,  $r=-0.06$ ), Antwerp ( $U=46,488$ ,  $z=-2.06$ ,  $p<0.05$ ,  $r=-0.08$ ), and Southern Denmark ( $U=624,671$ ,  $z=-5.388$ ,  $p<0.001$ ,  $r=-0.01$ ). However, as can be seen from the effect sizes, these differences were small. No significant gender difference was found at Karolinska Institutet or the Police College of Finland.

Similar results were found with regards frequency of drunkenness per week at Antwerp ( $U=45,135$ ,  $z=-2.42$ ,  $p<0.05$ ,  $r=-0.09$ ), Southern Denmark ( $U=639,454$ ,  $z=-4.575$ ,

$p<0.001$ ,  $r=-0.09$ ), and Karolinska Institutet ( $U=235,627$ ,  $z=-2.0$ ,  $p<0.05$ ,  $r=-0.05$ ). No significant gender difference was detected at Amsterdam or the Police College of Finland.

Significant results were found at the University of Southern Denmark, where more men reported that they smoked ( $\chi^2=19.641$ ,  $df=1$ ,  $p<0.001$ , Cramer's  $V=0.9$ ). No significant gender difference of smoking was found at the other institutions.

Males were found to be significantly more likely than females to report use of recreational drugs at the University of Amsterdam ( $\chi^2=41.439$ ,  $df=1$ ,  $p<0.001$ , Cramer's  $V=0.18$ ), the University of Antwerp ( $\chi^2=39.642$ ,  $df=1$ ,  $p<0.001$ , Cramer's  $V=0.246$ ), the University of Southern Denmark ( $\chi^2=64.489$ ,  $df=1$ ,  $p<0.001$ , Cramer's  $V=0.164$ ), and Karolinska Institutet ( $\chi^2=23.084$ ,  $df=1$ ,  $p<0.001$ , Cramer's  $V=0.113$ ). No significant gender differences were found at the Police College of Finland.

### Misperceptions of substance use

As demonstrated in Table 3, there were a number of students at each site who appeared to have overestimated the rates of substance use of their fellow students. The degree of overestimation varied by behaviour and location. Frequency of drunkenness and smoking were the most overestimated behaviours.

There was a significant difference between reported and perceived behaviour for most studied variables at each institution (Table 4), with respondents reporting perceived use to be heavier/more frequent. The effect sizes for frequency of drinking, particularly frequency of drunkenness, suggest that female students had a greater degree of misperception than male students.

### Factors associated with substance use

The perceived norm of each behaviour was found to be a significant factor associated with that behaviour, as demonstrated in Tables 5–8. Of all the perceived norms, those about frequency of drunkenness appeared to be the most strongly correlated with that behaviour. Gender, age, and personal use of other substances were also significant factors.

### Discussion

In support of the previously mentioned American studies, it appeared that the university students at each of the sites

**Table 1** Gender ratio of sample and population at each institution.

University/College	Sample gender ratio m/f	Student population ratio m/f <sup>a</sup>
Amsterdam	35/65	44/56
Antwerp	38/62	44/56
Southern Denmark	43/57	53/47
Karolinska Institutet	23/77	25/75
Police College of Finland	70/30	76/24

<sup>a</sup>Based on the most recently available figures from the respective administration offices of the university or college.

**Table 2** Personal substance use at each site.

	Frequency of drinking (median)	Frequency of drunkenness (median)	Incident of smoking in last 30 days, %	Incident of recreational drug use in last 30 days, %
Amsterdam	Twice a week	Once a month	23	18
Antwerp	Once a week	Once a month	26.9	16.6
Southern Denmark	2–3 times a month	Once a month	17.8	6.9
Karolinska Institutet	Once a week	Once a month	8.9	4.4
Police College of Finland	2–3 times a month	Once a month	19.2	0.5

**Table 3** Accuracy of perceptions of peers' substance use at each institution.

	Amsterdam, %	Antwerp, %	Southern Denmark, %	Karolinska Institutet, %	Police College of Finland, %
<b>Drinking</b>					
Underestimate	19	6	1	33	5
Accurate	44	23	25	42	42
Overestimate	37	71	74	25	53
<b>Drunkenness</b>					
Underestimate	1	1	1	1	0
Accurate	21	21	14	27	25
Overestimate	78	78	85	72	75
<b>Smoking</b>					
Underestimate	5	4	3	0	4
Accurate	16	8	15	17	8
Overestimate	79	88	82	83	88
<b>Drugs</b>					
Underestimate	13	15	1	5	15
Accurate	22	24	39	63	23
Overestimate	65	61	60	32	62

tended to overestimate the alcohol, tobacco, and recreational drug use of other students at their university. Perceived norms were also significantly associated with personal substance use, supporting the assertion of the social norms approach that misperceptions can fuel unhealthy behaviour. However, compared with studies in North America, these perceived norms were not arguably as powerful relative to other factors

(15). For several behaviours, demographic factors, such as age and gender, appeared to be equally strongly associated. This does not undermine the potential for the use of the social norms approach in European university settings, but it does highlight the need for a better understanding of how the environment and characteristics of a population shape the role of social norms.

**Table 4** Wilcoxon signed ranks test analysis of difference between reported and perceived norms.

Behaviour	Wilcoxon signed ranks test and effect size	
	Male	Female
<b>Frequency of drinking</b>		
Amsterdam	T=14,589, p<0.001, r=-0.30	T=27,705.5, p<0.001, r=-0.59
Antwerp	ns	T=6705, p<0.001, r=-0.60
Southern Denmark	T=92,764, p<0.001, r=-0.20	T=59,409, p<0.001, r=-0.58
Karolinska Institutet	T=13,880, p<0.001, r=-0.19	ns
Police College of Finland	T=1912, p<0.001, r=-0.52	T=70.5, p<0.001, r=-0.70
<b>Frequency of drunkenness</b>		
Amsterdam	T=10,418, p<0.001, r=-0.51	T=13,597, p<0.001, r=-0.72
Antwerp	T=5101, p<0.001, r=-0.31	T=5347, p<0.001, r=-0.65
Southern Denmark	T=51,775.5, p<0.001, r=-0.45	T=29,122, p<0.001, r=-0.71
Karolinska Institutet	T=7460.5, p<0.001, r=-0.48	T=34,256, p<0.001, r=-0.70
Police College of Finland	T=1405.5, p<0.001, r=-0.64	T=27.5, p<0.001, r=-0.78
<b>Smoking</b>		
Amsterdam	T=3347, p<0.001, r=-0.70	T=5498, p<0.001, r=-0.78
Antwerp	T=402, p<0.001, r=-0.80	T=1033, p<0.001, r=-0.82
Southern Denmark	T=6485, p<0.001, r=-0.78	T=9245, p<0.001, r=-0.79
Karolinska Institutet	T=70.5, p<0.001, r=-0.75	T=0, p<0.001, r=-0.80
Police College of Finland	T=216, p<0.001, r=-0.80	T=75, p<0.001, r=-0.80
<b>Drug use</b>		
Amsterdam	T=4801, p<0.001, r=-0.63	T=17,890, p<0.001, r=-0.66
Antwerp	T=1973, p<0.001, r=-0.60	T=4918, p<0.001, r=-0.63
Southern Denmark	T=1020, p<0.001, r=-0.70	T=1953, p<0.001, r=-0.67
Karolinska Institutet	T=972, p<0.001, r=-0.47	T=10,725, p<0.001, r=-0.44
Police College of Finland	T=0, p<0.001, r=-0.50	T=0, p<0.001, r=-0.57

Note: ns=non-significant at p<0.05.

**Table 5** Factors associated with cigarette smoking in the last 30 days (no use vs. use).

	Odds Ratio	Lower 95% CI	Upper
Constant			
Perceived rates of peer smoking (from 0%–10% to 90%–100%)	1.116 <sup>a</sup>	1.068	1.166
Gender (male/female)	0.885	0.761	1.029
Frequency of alcohol consumption (from never to daily)	1.145 <sup>a</sup>	1.084	1.209
Frequency of drunkenness (from never to daily)	1.366 <sup>a</sup>	1.280	1.458
Personal use of recreational drugs in last month (no/yes)	0.239 <sup>a</sup>	0.196	0.290
Age	1.314 <sup>a</sup>	1.202	1.436
Nationality (overseas/resident)	0.712 <sup>a</sup>	0.522	0.971
Residence (with peers/with family)	0.946	0.793	1.127

<sup>a</sup> $p < 0.05$ .  $R^2 = 0.10$  (Cox and Snell), 0.17 (Nagelkerke).

Furthermore, misperceptions about frequency of drunkenness appeared to be greater than those about frequency of drinking, an effect which was consistent at all five locations, as was also found to be the case in the UK (5) and Tasmania (7). Theories on the aetiology of normative misperceptions suggest that, amongst other factors, they are formed by processes, such as attribution error (17), where we assume that a behaviour displayed by an individual is indicative of their normal and regular behaviour. Drunkenness is arguably one of the most visible and noticeable behaviours associated with alcohol use and, perhaps, the most vulnerable to misperception. As Lintonen and Konu (9) commented, drunkenness is the aspect of young-adult alcohol use most commonly covered in media reports. Therefore, it may be that misperceptions that young adults hold about the drunken behaviour of their peers are inadvertently reinforced by media stories condemning such behaviour.

Overall male respondents did appear to drink alcohol more frequently and experience drunkenness more frequently than females; however, these differences were minor. Interestingly, female respondents appeared to have greater degrees of misperception about both behaviours, as evidenced in the effect sizes. A similar effect has been noted in the USA (4), but not in the UK, Hungary, Slovakia, Romania, and the Czech Republic (5, 10). It has been argued that the reason female American students report greater misperceptions is because when questioned about the alcohol consumption of a typical student, they visualise this person to be male, as they associate heavy drinking with men (18). This can be a problem, as it necessitates

the use of gender-specific social norms messages, because messages based on the “typical” student may be dismissed by female students as being irrelevant to them. Although the alcohol consumption of female students in the current study was largely comparable to that of male students, it may be that there remained a sense amongst both male and female of alcohol consumption being a predominately male activity.

Meanwhile, misperceptions about smoking and recreational drug use were broadly similar, suggesting that these behaviours may not be perceived to be associated particularly with either gender. However, the interpretation of the results is complicated by fact that Karolinska Institutet and the Police College of Finland have a high ratio of female/male and male/female students, respectively. It is unclear how male and female students conceptualise a “typical” student at these locations. To further confound the issue, both sites train students in professions that require an understanding of substance use, which may lead to them possessing more accurate knowledge than students on other courses. This is evidenced by the fact that the medical students at Karolinska Institutet reported a markedly more accurate perception of their peer’s frequency of drinking than at the other sites. This demonstrates the need to better understand how normative beliefs operate in more homogenous and specialist groups than have typically been examined in previous social norms studies of educational settings. It would also be of interest to further explore how normative beliefs develop and change in professionals working in areas, such as law enforcement and medicine, who often deal with the consequences of substance use.

**Table 6** Factors associated with recreational drug use in the last 30 days. (No use vs. use).

	Odds Ratio	Lower	Upper
Constant			
Perceived rates of peer recreational drug use	1.705 <sup>a</sup>	1.607	1.808
Gender (male/female)	2.333 <sup>a</sup>	1.896	2.869
Frequency of alcohol consumption	1.357 <sup>a</sup>	1.254	1.468
Frequency of drunkenness	1.185 <sup>a</sup>	1.089	1.289
Personal smoking in last month (no/yes)	0.246 <sup>a</sup>	0.200	0.303
Age	0.898	0.786	1.027
Nationality (overseas/resident)	0.938	0.637	1.380
Residence (with peers/with family)	1.103	0.866	1.404

<sup>a</sup> $p < 0.05$ .  $R^2 = 0.16$  (Cox and Snell), 0.34 (Nagelkerke).

**Table 7** Factors associated with frequency of drinking in the last 30 days (once a month or less vs. two to three times a month or more).

	Odds Ratio	Lower	Upper
Constant			
Perceived frequency of drinking	1.485 <sup>a</sup>	1.383	1.595
Gender (male/ female)	0.790 <sup>a</sup>	0.671	0.929
Frequency of drunkenness	7.386 <sup>a</sup>	6.431	8.482
Personal drug use in last month (no/ yes)	0.913	0.710	1.172
Personal smoking in last month (no/ yes)	0.745	0.497	1.117
Age	1.215 <sup>a</sup>	1.116	1.324
Nationality (overseas/ resident)	0.697 <sup>a</sup>	0.513	0.946
Residence (with peers/ with family)	1.162	0.910	1.484

<sup>a</sup>p<0.05. R<sup>2</sup>=0.25 (Cox and Snell), 0.39 (Nagelkerke).

There are some limitations to the current study design. It was an exploratory project that used a cross-sectional survey, and as such it was not possible to come to conclusions about the direction of causality between personal behaviour and perceived norms. This is a criticism, which has been made about many of the studies in the social norms field, although the issue has been partly addressed by work on temporal precedence, thus suggesting that norms do, in fact, cause behaviour (19). Nevertheless, there remains a need for longitudinal studies that follow cohorts of students over time, which allow for a more in-depth understanding of the development of normative misperceptions and how these influence personal behaviour.

Furthermore, the personal use items are simple ones. However, it should be re-iterated that the main focus of the study was not to record alcohol and drug use behaviours. If this had been the case, a more comprehensive series of measures could have been used. Instead, the aim of the survey was to examine misperceptions, which previous research in the field had done, using basic items targeting one or two key aspects of behaviours. It is also necessary for the questions about personal behaviour to be ones that can be easily conceptualised in terms of perceptions of others and measured using equally simple questions.

Related to the above point is the issue of using frequency of drunkenness as a measure. It is acknowledged that definitions of drunkenness can invariably differ between countries and even between individuals. It could be argued that the discordance between self-rated frequency of drunkenness and

perceived drunkenness of others stems from an inability to properly gauge levels of personal drunkenness. However, it has been shown that young people are actually able to report their drunkenness in a valid (20) and reliable (21) manner. Provided that individuals are consistent in applying their own definition to themselves and their perceptions of others, it is not as relevant to social norms projects if there are differences between individual definitions. In addition, some researchers have argued that a subjective perception of drunkenness can be a more accurate predictor of alcohol-related harm than objective measures of alcohol consumed (22, 23).

Overall however one of the main limitations of the study is the sample size. With the exception of the Police College of Finland, the sample in each instance represented a relatively small number of the total university population. In some instances, it was difficult to quantify a response rate for the survey, such as in the aforementioned case of the University of Antwerp. Even at the universities where an email invitation was sent to every registered student, there remained some uncertainty over how many of these students actually attended the university, how many checked their university email account during the time of the survey, and how many left the university but remained on the system.

In conclusion, this study demonstrates the ubiquitous nature of alcohol and drug-related normative misperceptions in student populations internationally. However, it also highlights that cultural differences do appear to exist in the magnitude and nature of misperceptions. With the growth in popularity of the social norms approach in Europe, it is important that a

**Table 8** Factors associated with frequency of drunkenness in the last 30 days (once a month or less vs. two to three times a month or more).

	Odds Ratio	Lower	Upper
Constant			
Perceived frequency of drunkenness	1.940 <sup>a</sup>	1.806	2.084
Gender (male/ female)	2.061 <sup>a</sup>	1.799	2.360
Frequency of alcohol consumption	2.371 <sup>a</sup>	2.247	2.501
Personal drug use in last month (no/ yes)	0.708 <sup>a</sup>	0.558	0.898
Personal smoking in last month (no/ yes)	0.483 <sup>a</sup>	0.405	0.576
Age	0.512 <sup>a</sup>	0.469	0.560
Nationality (overseas/ resident)	0.769	0.579	1.021
Residence (with peers/ with family)	2.307 <sup>a</sup>	1.939	2.744

<sup>a</sup>p<0.05. R<sup>2</sup>=0.34 (Cox and Snell), 0.48 (Nagelkerke).

more thorough understanding is reached of social normative processes, and how these can be used to reduce alcohol and drug related harm.

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