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Changes in drug use among Belgian higher education students : a comparison between 2005, 2009, and 2013

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1 **Changes in drug use among Belgian higher**
2 **education students: a comparison between**
3 **2005, 2009 and 2013**

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5

6 **Manuscript details**

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12 **Abstract**

13 **Background**

14 **Most drug users initiate illicit drug use during adolescence and young adulthood.** Although in
15 the general population a trend towards a decrease in drug use can be seen, patterns of drug use
16 among students are unclear.

17 **Objectives**

18 The objective of the study was to look at drug use patterns among students in higher
19 education **in Belgium.**

20 **Methods**

21 To gain more knowledge about the drug use of students, a survey study in Antwerp (Belgium)
22 was conducted on three occasions (2005, 2009 and 2013) at several institutes for higher
23 education. Students (total sample size 24,478; 29,210 and 31,950 respectively) were asked if
24 they had used legal or illicit drugs in the past year. To compare whether drug use differed
25 between the separate years, χ^2 -tests were performed on past-year drug use for all three time
26 points. If significant, χ^2 -tests between pairs were performed. **Gender and age differences were**
27 **also analysed.**

28 **Results**

29 Results comparing the selected periods indicated that the use of non-distilled alcohol, spirits
30 and cannabis decreased and that no change in student's use patterns was seen for beer, wine,
31 sedative hypnotics, stimulating medication, XTC, cocaine or amphetamines. Tobacco use
32 decreased initially, but increased in 2013. More **men indicated having used drugs in the past**
33 **year than women. Only for cannabis did more younger students indicate having used in the**
34 **past year.**

35 **Conclusions/Importance**

36 These results show that drug use among students is a complex matter that could be
37 influenced by a number of things, among which are social norms. In order to have an effective
38 prevention programme to decrease drug use, lessons learned from the social norms approach
39 could be helpful. The data from this study could provide insights for academic and
40 governmental bodies and health care professionals into the use of drugs by higher education
41 students since this subgroup shows specific use patterns.

42

43 **Introduction**

44 Legal and illicit drug use in the general population is highly prevalent, although the
45 percentage of persons in the European Union indicating having used any legal drugs, such as
46 alcohol (at least 73.5%) or tobacco (at least 48%) (Degenhardt et al., 2008) is much higher
47 than estimates for illicit drug use. According to the 2014 European Monitoring Centre for
48 Drugs and Drug Addiction (EMCDDA) drug report (EMCDDA, 2014), a quarter of all
49 European adults (15-64 years of age) have ever used illicit drugs. Of all European adults,
50 21.7% indicate having ever used cannabis, 4.2% have indicated using cocaine at least once in
51 their lifetime, and 3.1% had used ecstasy at any point. Among students, these numbers are
52 similar. A recent Europe-wide study has shown that at least 90% of all adolescents (age 17-18
53 years) had ever used alcohol, 72% smoked, and 15% admitted to having used any illicit drug
54 (Andersson et al., 2007), although it must be noted that use patterns vary widely between the
55 different countries.

56 Both legal and illicit drug use can have a number of consequences at a personal level
57 and at a societal level. These consequences include, but are not limited to neuropsychiatric
58 disorders (such as depression and schizophrenia), cardiovascular, renal or urinary disease
59 (Degenhardt & Hall, 2012), legal repercussions and increases in criminal and delinquent
60 behaviour (Dobkin & Nicosia, 2009; Reuter & Kleiman, 1986). Most of these issues only
61 (start to) arise after a period of use and do not happen to all persons who ever used a certain
62 drug. However, a particular risk factor in continuing drug use and possible consequent drug
63 addiction is the age of initiation of drug use (National Institute on Drug Abuse (NIDA),
64 2003). Young adults aged between 18 and 25 are more likely to use legal and illicit drugs than
65 any other age group (Young et al., 2002). Since this is usually the age at which a person goes
66 on to study in a higher educational setting, that makes this group particularly interesting in
67 studying the evolution of drug use in a higher education over a period of time. This would
68 allow us to see how patterns of drug use change over time between different student cohorts.
69 Furthermore, knowledge about the number of students using drugs could be of interest to
70 governing bodies of higher education institutes and public policy.

71 Therefore, the current study was aimed at comparing the occurrence of drug use
72 among students of several institutes for higher education in Antwerp, Belgium over a period
73 of 8 years. During these 8 years, at three time-points (2005, 2009 and 2013) the student
74 population was asked to fill out a questionnaire focusing on legal and illicit drug use.

75

76 **Methods**

77 *Participants and recruitment*

78 Data reported in this study are part of an ongoing cross-sectional study initiated by the
79 University of Antwerp and the Organisation for Alcohol and other Drug Problems (VAD). All
80 participants were students at four institutes for higher education in the region of Antwerp,
81 Belgium.

82 The data used covers 8 years in total, with questionnaires being administered in 2005,
83 2009 and 2013. Each time, the survey was undertaken in the second semester of the school
84 year, from February until April and students could fill out the questionnaire online. An
85 accompanying letter explained the purpose of the study. Flyers and posters were distributed
86 on all campuses to ensure visibility of the study and increase responses. From the respondents
87 of all three questionnaires (2005, 2009 and 2013) separately, a randomly selected stratified
88 sample was drawn to accurately represent the Antwerp student population. The strata used
89 were (1) the student's institution and (2) gender. The number of students in each sample was
90 determined using a confidence level of 95% and confidence interval of +/-2.5% with a
91 response distribution of 50%. In Table 1, all sample characteristics are presented. Some
92 categories could not be completely filled, because too few persons exhibiting those
93 characteristics filled out the questionnaire in that year. It was decided to not increase the
94 number of the other strata, in order to not skew the data too much.

95 Participants could voluntarily participate in a lottery by entering their e-mail address,
96 with which they could win various prizes (such as a USB-stick, gift voucher or iPad).

97

98 -insert Table 1-

99

100 *Measures*

101 Demographic measures such as age, gender, faculty and living conditions (on their own or
102 still at home) were collected before administration of the questionnaires. Frequency of drug
103 use was assessed by first asking whether or not the student had ever used that drug in their
104 life-time (LT). If they indicated yes, several follow-up questions were asked, from which last-
105 year use (LY) was selected as the variable of interest. **The content and structure of these**
106 **questions were taken from other well-known validated sources such as the Belgian Health**
107 **Interview. Whenever this was not possible, for example for drugs that were not represented in**
108 **the previously named survey, the same sentence structure as for the other drugs was used and**
109 **only the name of the drug was changed.** In total, 5 legal drugs were investigated (nicotine,
110 beer, wine, fortified wine and spirits). Two types of medication were also assessed (stimulants

111 and sedative hypnotics). Finally, students were asked to indicate if they used illegal drugs
112 (cannabis, ecstasy, cocaine or amphetamines).

113

114 **Statistics**

115 For each substance, only students that indicated having used drugs in the past year were
116 included in the analysis. In order to compare drug use patterns over three years, χ^2 tests were
117 performed for all substances. If this initial analysis showed a significant difference between
118 the three years, separate χ^2 tests between pairs of years (2005-2013, 2009-2013, 2005-2009)
119 were performed to see when exactly substance use differed. For each year separately,
120 additional χ^2 analyses were done to investigate whether there were age (21 years or older vs.
121 under 21 years of age) or gender (male vs female) differences in substance use. Statistical
122 significance was set at $p < .05$ (two-tailed).

123 To increase the representativeness of the study, all data were weighted according to
124 gender and institution, since distribution of these variables differed from those in the
125 population. All analyses were performed using SPSS 22 (IBM SPSS Statistics for Windows,
126 Version 22.0).

127

128 **Results**

129 *Prevalence of substance use*

130 In Figure 1, data is shown on the percentage of past year drug use in total number of
131 respondents. The corresponding significance values are noted in Table 2.

132

133 -- Figure 1 --

134

135 On average, 36% of all students indicated having smoked tobacco in the past year. However,
136 there was a significant difference between the three years of the questionnaire with regard to
137 the amount of students smoking. From 2005 to 2009, there was a significant decrease in the
138 number of students smoking (from 37.2% to 31.0%, $p < .001$). This effect was reversed in the
139 following year of the questionnaire, 2013, when 40.4% of all students indicated having
140 smoked in the year before.

141

142 -insert Figure 1-

143

144 There was a significant decrease in the use of fortified alcohol such as port or
145 vermouth from 2005 to 2009 ($p < .001$) and from 2009 to 2013 ($p < .001$), going from 73.1% in
146 2005 to 48.4% in 2013. This decrease in stronger alcoholic drinks was also seen in the
147 consumption of spirits (e.g. vodka, whisky, rum), which significantly decreased from 2005 to
148 2009 (from 80.6% to 76.1%, $p < .01$) and then remained around the same level in 2013. There
149 was no change in the use of beer or wine, which respectively 77.4% and 81.5% of all students
150 reported having drunk in the past year on average.

151 Except for cannabis, there were no changes in illicit drug use over the years of the
152 survey. Illicit drugs, such as cocaine, amphetamines or ecstasy were on average used by 3.5%,
153 2.5% and 3.2% of all students, respectively. Cannabis was the most used drug of all illicit
154 drugs, although its use decreased significantly over the years. From 2005 to 2013, the past
155 year use of cannabis decreased from 24.5% to 19.2% ($p = .001$).

156 Students were also asked whether or not they had used sedative hypnotic medication
157 (benzodiazepines like Valium® or Xanax®) or stimulant medication such as Ritalin® or
158 Concerta®, without classifying if their use was on prescription or not. There was a small
159 number of students indicating having used these drugs in the past year (on average 5.3% and
160 3.9% respectively), but no changes in use were seen over the years.

161

162 -- insert Table 2 --

163

164 *Age, gender and drug use*

165 To investigate the role of age and gender in past-year drug use among students, exploratory
166 analyses were done. Over all three years, only for cannabis did all χ^2 tests indicate that age
167 significantly affected the likelihood of use in the past year. However, whereas the pattern for
168 use was similar in 2005 and 2009, with more persons under 21 using cannabis, this was the
169 other way around in 2013 and thus there was no significant age effect spanning all years.

170 For gender, it was most notable that, on average, male students were less than half as
171 likely as female students to use sedative hypnotics such as Valium® or Xanax® (RR 0.44; CI
172 0.27-0.74). Men were on average twice as likely as women to have used any illicit drug, using
173 more cocaine, cannabis, XTC and amphetamines than women (RR 2.64, CI 1.44-5.05; RR
174 1.82, CI 1.50-2.24; RR 2.02; CI 1.10-3.64 and RR 2.02; CI 1.07-3.81 respectively) and also
175 used more stimulant medication (RR 2.14; CI 1.29-3.54). There was little difference in gender
176 for tobacco and alcohol use in general (from minimum RR 1.00 for wine (CI 0.95-1.06) to

177 maximum RR 1.30 (CI 1.13-1.49) for tobacco), with men using slightly more beer and
178 tobacco than women.

179

180 Discussion

181 This study shows that illegal drug use continues to be an issue in students in the Antwerp
182 region, in particular within the male student subgroup. The most used drug among students
183 remains alcohol, with wine (81.5% on average), beer (77.4% on average) and/or spirits
184 (77.2% on average) being the drinks of choice for most students. However, a decrease in the
185 use of spirits and fortified drinks has been seen over the three years of the questionnaire (from
186 2005 to 2013), while the use of wine and beer remained constant. Alcohol use among students
187 remains a topic of much debate. Misuse of alcohol, especially through binge drinking, can
188 have numerous consequences, both acute and long-term. For example, drinking large
189 quantities of alcohol can lead to harmful behaviours such as driving under the influence,
190 having (unprotected) sex or exhibiting anti-social behaviour (Van Damme et al., 2013). Long-
191 term heavy drinking can cause permanent damage to the body, such as liver disease or brain
192 damage (Costin & Miles, 2014; Welsh, 1997). In that light, the decrease in use of strong
193 alcohol is encouraging. However, since there was no change in the use of beer or wine, more
194 knowledge needs to be gathered on why this pattern of use occurred the way it did over the
195 years of the study. Furthermore, it would be interesting for future years to see if this pattern
196 continues or if the use of beer and wine follows the same trajectory as the other types of
197 alcohol.

198 The use of tobacco in the past year among the student population of Antwerp
199 decreased initially from 2005 to 2009 (from 37% to 31%) but showed an increase in 2013 (to
200 40.4%). This is at odds with a general downward trend in tobacco use in Belgium that went
201 from 30% to 25% in daily and occasional smokers from 1997 to 2014 (Scientific Institute of
202 Public Health, 2014). Since 2005, more and more anti-tobacco laws have been implemented
203 in Belgium, including prohibition of commercials for tobacco products, smoking in
204 restaurants and other public places and increasing tobacco prices. This generalized approach
205 towards smoking prevention has clearly been successful in the Belgian population, as
206 evidenced by a decrease in use. Nonetheless, tobacco use among Antwerp students remains
207 high and shows no sign of decline. Exactly why this is the case is unknown. However, the
208 data currently presented for the Antwerp student population did not take into account whether
209 respondents were daily or occasional smokers. Persons between the age of 14-25 are more
210 likely to experiment with tobacco, alcohol or drugs (EMCDDA, 2014; Young et al., 2002). It

211 might therefore be the case that the majority of respondents answering 'yes' to the question of
212 whether they used tobacco in the past year were persons who smoked only occasionally.
213 Thus, these results might not accurately reflect the true proportion of daily smokers. It is
214 possible that the number of occasional smokers increased while the number of daily smokers
215 decreased, so that the total number of smokers in the last year did not change or even showed
216 an increase. Since the survey included questions as to the use pattern of the participants, it
217 was possible to check this assumption. Post-hoc statistical tests using a log-linear model
218 confirmed this hypothesis. From these analyses, it could be seen that the amount of occasional
219 smokers increased more than the decline in daily smoking from 2005 to 2013. This led to a
220 seeming increase in smoking in the past year in 2013 compared to 2005 and 2009, which in
221 reality was caused by an increase in occasional smokers but a decrease in daily smokers.

222 Despite a number of legislative and social efforts, the use of illicit drugs other than
223 cannabis has remained stable, but low. Only a small number of students over the years have
224 indicated having used ecstasy, cocaine, or amphetamines, with little to no variation seen in
225 last year use. Notable is the strong decrease in cannabis use from 24% in 2005 to 19% in
226 2013, although it is still used the most out of all illicit drugs. On average, 22% of all students
227 indicated having used cannabis in the past year, as compared to an average of 3.5% for the
228 next most used drug, cocaine.

229 The current results on gender differences in past year drug use are in accordance with
230 other publications showing that men are more likely to use drugs than women (see Becker &
231 Hu, 2008), apart from the use of sedative hypnotic medication which is more associated with
232 use by women (John et al., 2007; Rawson & D'Arcy, 1998). The same trends are seen in the
233 student sample where illicit drug use is twice as prevalent among men than among women but
234 where men are less than half as likely to use sedative hypnotic medication than women.
235 Therefore, any policy focusing on decreasing and preventing drug use should take into
236 account both male and female users and the way they might differ in their drug use patterns.
237 Age did not seem to affect drug use in general very much; only on past year cannabis use
238 could a trend toward more use in younger students (under 21) versus older students (21 or
239 older) be seen. Nevertheless, this information might be used by policymakers (such as
240 university councils) to focus their efforts in drug use prevention on different age groups,
241 whereby the younger and older students might be approached differently.

242 The data gathered from this study show that a large proportion of students use legal or
243 illegal substances. Alcohol use in particular remains popular among students, since it is used
244 by almost all participants and widely available. Since substance use can lead to a number of

245 societal and personal problems, prevention of drug use has been a priority for university
246 governing bodies. One of the most promising approaches to prevention of drug use is the
247 social norms approach. The social norms approach aims at addressing behaviour towards, for
248 example, drug use (descriptive norms) as well as making attitudes towards drug use more
249 explicit (injunctive norms) (Berkowitz, 2005; Perkins, 2003). Implementation of a social
250 norms campaign in universities and other institutes of higher education in the United States of
251 America have shown a reduction rate in alcohol and tobacco use of more than 20% (see
252 Berkowitz, 2005) and recent studies have shown the efficacy of social norms approaches in
253 Europe to be comparable to those in the USA (Bewick et al., 2010; Robinson et al., 2014;
254 Teunissen et al., 2014). Combined with the knowledge gathered from the current study about
255 actual student drug use, more research into the social norms of students in higher education
256 regarding the use of drugs could lead to a reduction in (problematic) drug use.

257 Through the years, the number of students participating in the questionnaire has varied
258 considerably and this could potentially limit the interpretation of the results. While in 2005
259 22.5% of all students participated, in 2009 this was only 5.4% but this number was raised to
260 13.7% in 2013. This exemplifies the importance of good promotion of such a study. In 2005,
261 a lot of effort was put into promoting the questionnaire, including handing out flyers, posters
262 and sending out personalized e-mails. In 2009, less attention was paid to the study and
263 therefore the number of participants dropped drastically. In 2013 more attention was paid to
264 the way the study was promoted among the students and the level of participation increased.
265 Another reason for the relatively low number of participants could be that the questionnaire
266 raises sensitive topics. Questionnaires asking about sensitive topics such as drug use, income
267 or sex typically have smaller response rates (Tourangeau & Yan, 2007). We have tried to
268 reduce this effect by making the questionnaire available online, which is generally less
269 threatening, as well as reassuring the participants that nothing they would indicate on the
270 questionnaire would have legal or social consequences and their data would remain
271 confidential. Furthermore, over the years, more and more survey research has been conducted
272 at the University of Antwerp. It could therefore be that the decline in response rate is partly
273 due to the student body becoming disinclined to answer any questionnaire, especially since
274 this questionnaire took quite a lot of time to fill out. However, by drawing a representative
275 sample from the completed questionnaires, we still ensured that the data presented are an
276 accurate representation of the total student population in Antwerp.

277 In conclusion, over 8 years no change occurred in past year use of illicit drugs such as
278 cocaine or cannabis in Belgian higher education students. The amount of strong alcohol drunk

279 in the past year, such as spirits or fortified beverages, did decrease significantly from 2005 to
280 2009 and to 2013. Overall, despite a number of anti-tobacco laws, the use of tobacco in the
281 past year among students in Antwerp did not decrease and neither were there any differences
282 in the use of beer or wine. Gender differences in patterns of drug use show that while male
283 students use more illicit drugs and female students use more sedative hypnotics, there are no
284 gender differences for alcohol or tobacco. Only cannabis use in the past year was affected by
285 age, but a clear overall pattern did not emerge. Clearly, these results show that drug use
286 among students is a complex matter. In order to develop an effective prevention programme
287 to decrease drug use, university councils could learn from the social norms -approach.

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292

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362 Social motives for drinking in students should not be neglected in efforts to decrease
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372

373

374 **Figures and tables**

375 **Figure 1:** last year (LY) drug use in students calculated as a percentage of the total number of all respondents. †= significant
 376 χ^2 test over all years ($p < .01$) ‡ = significant difference ($p < .05$) between 2005 and 2013. * = significant difference between
 377 subsequent years ($p < .05$)

378
 379
 380

	2005		2009		2013	
	Population	Sample	Population	Sample	Population	Sample
N	24478	1451	29210	1405	31950	1295
Age (mean)		20 (19 - 22) *		20.6 ± 2.0		21.4 ± 3.7
Gender (male)	46.3%	45.3%	46.7%	43.9%	46.3%	43.40%
Response rate**	22.5%		5.4%		13.70%	

381 **Table 1:** sample characteristics of 2005, 2009 and 2013 student questionnaires.

382 * for 2005 data were measured on an ordinal level, therefore the median and interquartile range is reported instead of the
 383 mean

384 ** response rate is measured as the number of respondents relative to the total student population

A: Last year use							B: χ^2 tests			
	2005		2009		2013					
	% All respondents	% Ever used	% All respondents	% Ever used	% All respondents	% Ever used	Overall	2005-2009	2005-2013	2009-2013
Tobacco	37.2	59.6	31.0	61.0	40.4	63.4	<.001 (27.19)	<.001 (12.42)	-	<.001 (26.15)
Beer	78.3	85.2	77.4	85.3	76.5	88.8	-	-	-	-
Wine	83.3	89.0	79.9	89.5	81.5	92.4	-	-	-	-
Fortified alcoholic drinks	73.1	86.0	64.6	82.2	48.4	72.1	<.001 (171.27)	<.001 (23.66)	<.001 (175.3)	<.001 (72.18)
Spirits	80.6	87.8	76.1	87.4	75.1	90.5	.001 (13.72)	.004 (8.45)	.001 (12.08)	-
Sedative-hypnotics	4.5	33.7	6.0	41.5	5.3	48.9	-	-	-	-
Stimulant medication	3.3	33.3	4.0	38.9	4.3	58.9	-	-	-	-
Cannabis	24.5	50.4	23.0	51.9	19.2	53.3	.003 (11.97)	-	.001 (11.56)	.015 (5.96)
XTC	3.0	28.3	2.9	25.0	3.7	55.8	-	-	-	-
Cocaine	3.2	28.2	3.8	39.3	3.5	49.5	-	-	-	-
Amphetamine	2.4	22.2	2.4	23.1	2.6	48.6	-	-	-	-

Table 2: A) The percentage of persons indicating having used a certain drug in the past year as a proportion of all respondents and as a proportion of persons indicating having ever used that drug. B) Results of 2 tests comparing the difference between years in last year drug use as a proportion of all respondents (p, pearson value).