

## CHAPTER 8. EXPOSURE TO ONLINE ALCOHOL MARKETING AND ADOLESCENTS' BINGE DRINKING: A CROSS-SECTIONAL STUDY IN FOUR EUROPEAN COUNTRIES

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### Summary

The role of alcohol advertising on adolescents drinking is gaining increased attention in academic and policy circles, and, in particular, there is a growing need for evidence-based knowledge on the interactions between online alcohol advertising and adolescent consumption in Europe.

This study investigates associations between online alcohol marketing exposure and binge drinking among adolescents in Germany, Italy, the Netherlands and Poland. Binary and logistic regression analyses were undertaken on cross-sectional cross-country survey data from a total of 9032 students with a mean age of 14.05 (SD.82). Exposure to alcohol marketing in online media and television, and ownership of alcohol branded items was estimated together with social influences, demographics as well as media use and onset of binge drinking in the last 30 days was measured as an outcome variable.

A higher exposure to online alcohol marketing was found to increase the odds of binge drinking in the last 30 days ( $p < .001$ ). This effect was found to be consistent in all four countries. Youngsters in the four European countries report being frequently exposed to online alcohol marketing. The association between this exposure and adolescents' binge drinking was robust and seems consistent in several national contexts.

### Introduction

#### Underage binge drinking in the European Union

Heavy episodic drinking or binge drinking among youth is associated with being involved in accidents, getting into fights, problems at school or work, passing out and having unsafe sex (Wechsler & Nelson, 2001). Long term effects, among others, are: liver damage, depression, brain impairment and alcohol problems later in life (McCambridge, McAlaney, & Rowe, 2011; Wechsler, Davenport, Dowdall, Moeykens, & Castillo, 1994). The prevalence of binge drinking (having five or more drinks on one occasion) among 15 and 16 year olds differs greatly between European countries, ranging from 13% in Iceland to 56% of students reporting such behaviour in Denmark and Malta. In almost all European countries, however, binge drinking is more common among boys than girls (Hibbel, 2012).

#### The role of alcohol advertising

The role of alcohol advertising on adolescents drinking has recently gained increased attention. In general, longitudinal studies show a moderate but significant effect of alcohol advertising exposure on adolescents drinking (Anderson et al., 2009; Smith & Foxcroft, 2009). Most of these studies examine the impact of traditional media and do not include alcohol advertising in digital media. However, lately, somewhat more attention has been given to this. The only studies conducted in Europe have looked at Scottish youth, and suggest a cumulative

effect of alcohol marketing channels on drinking, which includes exposure to non-traditional media (Gordon et al., 2010, 2011; Gordon, MacKintosh, & Moodie, 2010). A study by Lin et al (2011) underlines the importance of examining the impact of web-based marketing in addition to traditional marketing, as this has been found to be a significant predictor of onset of drinking and the amount of drinking among teenagers from New Zealand. Additionally, results of a cross-sectional study among Australian adolescents are consistent with studies from other countries and suggest that exposure to online alcohol advertisements are associated with drinking patterns (Jones & Magee, 2011).

### Alcohol advertising in digital media in Europe

The current study looks at the impact of alcohol marketing exposure on recent binge drinking among European youth from Germany, Italy, the Netherlands and Poland, with a special focus on the impact of alcohol marketing in digital media. This is particularly relevant due to the large amounts of time European youngsters spend using digital media. The internet is the leading medium, and even more time is spent on the internet than watching television (EIAA Mediascope Europe 2007). The alcohol industry has made the use of the internet as a marketing tool common practice, most notably via producers' websites, by banners on other websites and on social networking sites (Nicholls, 2012). For example, as of November 2011, ten alcohol brands chosen for their youth appeal had uploaded 35,725 photos on Facebook (CAMY, 2011).

### What we did

#### Survey design

In each country, Germany, Italy, the Netherlands and Poland, a stratified sample of schools in an urban and rural area was taken, giving a total of 339 schools, of which 163 were eligible for participation. Of the eligible 10810 students that were invited, 9709 participated (89.8% response rate). Two thirds of the non-response of individuals was due to lack of active parental consent (N=732); non-response in the remainder was mostly due to lack of motivation in the students' teachers. Technical difficulties concerning the internet connection at the times of the survey, or other technical failures, reduced the sample to 9032 students. For these, data was recorded using the online questionnaire and responses to appropriate questions. The mean age of the sample was 14.05 (SD .82), and 50% were male.

Before drafting the questionnaire, 8 focus groups were held in each country with 12-15 year-olds (a total of 32 focus groups, N=218), in order to examine the cultural context of the concepts of interest (see also Hellman et al., 2011). A draft of the survey was pre-tested and commented upon by approximately 100 students in each country. Data was collected through self-administered online questionnaires, which were anonymous. Students who volunteered to participate gave active consent. In Germany, active parental consent was required, in all other countries passive parental consent was used. Ethical approval of the study was granted by the European Commission and the Ethical board of the Radboud University (number ECG 24092009).

#### Alcohol use

Onset of binge drinking was established by asking respondents 'During the last 30 days, how many times did you have five or more drinks on the same occasion?' Students that responded positively were classified as 'recent binge drinkers', all others were classified as 'not recent binge drinkers'. This question mirrored questions used in the ESPAD survey (Hibell, 2009).

### Alcohol marketing exposure

Dichotomous questions used by Gordon et al (2010; 2011; Lin et al 2011) were adapted to measure the frequency of exposure to alcohol marketing in online media with a 5-point Likert scale (1 never, 2 rarely, 3 sometimes, 4 often, 5 very often). Respondents were asked whether they had ever received 'promotional mail, e-mails or joke, chain, or wind up e-mails mentioning alcohol brands', 'looked at a web site for alcohol brands or about drinking (not including health-related sites)', 'downloaded a mobile phone or computer screensaver containing an alcohol brand name or logo', 'used a profile page on sites such as Hyves, Facebook, MSN or Myspace containing alcohol brand or logo', 'noticed an internet page that contained an alcohol advertisement', and 'purchased or ordered alcohol via the internet'. All items were combined into one factor (Eigen value= 2.544 with 50.88% variance explained and Cronbach Alpha=.742).

Ownership of an alcohol-branded promotional item was determined by asking respondents 'Do you own an item – like a t-shirt, lighter, matches, hat, or sunglasses – with an alcohol brand name on it?' (Henriksen et al., 2008). Those who answered 'Yes' to this question were coded as owner of an alcohol branded promotional item. Respondents answering 'No' or 'I don't know' were coded as not being an owner of an alcohol branded promotional item.

Exposure to televised alcohol advertising was measured by asking respondents about the frequency with which they had seen a selection of 8 television programmes in February 2010 (approximately 1-2 months before the survey). Respondents indicated their frequency of watching with a 5-point Likert scale (1 never, 2 rarely, 3 sometimes, 4 often, 5 very often). The list of television programmes in each country questionnaire was drawn from a list of most popular television programmes among 13-17 year olds in each country during which (or immediately before or after) an alcohol commercial was aired. A total score of televised alcohol advertising exposure was calculated by multiplying the number of ads broadcasted in each programme by the frequency of watching the programme. These scores were added together for each respondent and divided by the total number of alcohol ads broadcast in all 8 television programmes, to get a score between zero and one for each respondent.

### Confounders

Demographic data were recorded for age, gender, education and smoking (yes/no). Social influences were measured by perceived constraints towards alcohol use in religion (yes/no), number of four closest friends drinking and their approval of participant's drinking, alcohol use of mother and whether she gave the participant permission to drink. Additionally, non-alcohol-branded media exposure was measured. Internet use was measured by asking respondents 'On a usual school day (Monday to Friday) how many hours do you spend using the internet?' indicating (1) None; (2) Less than 1 hour; (3) 1-2 hours; (4) 3-4 hours; (5) 5 hours or more. Additionally, exposure to non-alcohol-branded television programmes was measured by asking respondents the frequency of watching 4 television programmes in which (or around which) no alcohol advertisements were aired. The selection of television programmes in each country was based on a list of the most popular television programmes among 13-17 year-olds in each country in September 2010, obtained from Nielsen Media.

### Statistical analysis

Analyses were conducted with M-Plus version 6.1. Data were nested due to the school-based sample design. Consequently, in all models, class was identified as a cluster variable which resulted in sandwich adjusted variance.

Descriptive analysis was carried out by observing the prevalence of drinking and other measures in each country, compared to the total sample. Binary logistic regression analysis was carried out to observe whether alcohol marketing exposure and, more specifically, online alcohol marketing exposure was associated with being a recent binge drinker, independent of potential confounders. In a second step, possible differences in effect sizes of the impact of online alcohol marketing was examined by generating unconstrained the effect sizes, so as to be equal between countries, with all other parameters being equal. In a third step, models were run for each country separately.

### What we found

Table 1 presents the distributions of study variables among respondents from each participating country, and for the total sample. Non-drinkers accounted for approximately half of the respondents, and this group was smallest in Italy, with approximately one third of the sample never using alcohol. Approximately three-quarters of the respondents were not classified as binge recent drinkers, ranging from 65 percent in Italy to 82 percent in the Netherlands and Poland.

**Table 1. Sample descriptives**

		Overall (n=9032)	Germany (n=1857)	Italy (n=2654)	Netherlands (n=2038)	Poland (n=2433)
<i>Alcohol use</i>	Onset of drinking					
	Never used alcohol	47	46	32	55	59
	Ever used alcohol	53	54	68	45	41
	Binge drinking last 30 days					
	Never	74	70	65	82	82
	Once	8	10	11	6	6
	2-5 times	13	15	19	9	8
>5 times	4	5	6	3	3	
<i>Demographics</i>	Female	50	48	50	51	51
	Age, mean (SD)	14.05(.82)	13.86(.73)	14.77(.70)	13.8(.54)	13.57(.62)
	Education					
	General level	28	4	0	0	100
	Lowest level	26	35	28	47	0
	Intermediate level	22	36	30	26	0
	Highest level	24	26	42	27	0
	Smoking					
	Never smoked	67	73	54	77	71
	Ever smoked	22	19	27	17	23
Nowadays smoke	11	8	19	6	7	
<i>Social influences</i>	Number of four friends using alcohol					
	0	47	47	33	58	54
	1-2	27	29	32	23	24
	3-4	26	23	36	19	22
	Permission peers alcohol use					
	Unlikely*	43	41	24	44	65
	Neither unlikely nor likely	33,4	24,0	18,0	22,0	22,7
	Likely	23	26	37	28	12
	Alcohol use mother					
	Never/Almost never/ I don't know	47	53	67	55	14
	Every month	21	16	8	7	51
	More times a month	10	11	5	9	17
	Every week	12	13	10	14	11
	More times a week/daily	11	8	11	16	8
	Permission mother alcohol use					
	Unlikely	68	72	55	64	84
	Neither unlikely nor unlikely	27	22	43	25	13
Likely	5	6	3	12	3	
Restrictions alcohol in religion						
No	90	94	92	94	80	
Yes	11	6	8	6	21	

Table 1 (cont.). Sample descriptive

		Overall (n=9032)	Germany (n=1857)	Italy (n=2654)	Netherlands (n=2038)	Poland (n=2433)
<i>Media exposure</i>	Exposure non-alcohol branded TV programs, mean (SD)	2.12(.84)	.34 (.19)	2.23 (.80)	2.20 (.82)	2.11 (.93)
	Hours spend on the internet					
	None	8.5	4.3	13.9	5.9	7.8
	Less than 1 hour	19.9	17.7	21.9	23.0	16.9
	1-2 hours	32.8	34.8	32.6	34.0	30.5
	3-4 hours	22.5	24.3	19.5	23.0	24.3
	5 hours or more	16.2	18.9	12.0	14.1	20.5
<i>Alcohol marketing exposure</i>	Ownership ABI					
	No	74	80	71	76	69
	Yes	27	20	29	24	31
	Exposure alcohol branded TV programs, mean (SD)	.28 (.22)	.19 (.73)	.34 (.19)	.42 (.24)	.18 (.22)
	Ever received promotional emails					
	Never	67	63	67	69	68
	Rarely/ Sometimes	27	32	28	26	25
	Often/ Very often	6	5	5	6	7
	Ever looked at websites for alcohol brands					
	Never	79	74	77	79	84
	Rarely/ Sometimes	18	23	20	18	13
	Often/ Very often	5	3	4	3	4
	Downloaded a screensaver with alcohol ad					
	Never	82	86	71	86	87
	Rarely/ Sometimes	14	11	13	11	10
	Often/ Very often	4	3	6	3	4
	Used a profile site on social media with alcohol ad					
Never	68	79	75	71	49	
Rarely/ Sometimes	25	17	20	22	39	
Often/ Very often	7	4	6	7	12	
Noticed an alcohol ad on internet page						
Never	34	53	31	37	22	
Rarely/ Sometimes	45	37	50	53	48	
Often/ Very often	21	10	19	21	30	

Table 2. Binary logistic regression results on the odds of onset of recent binge drinking

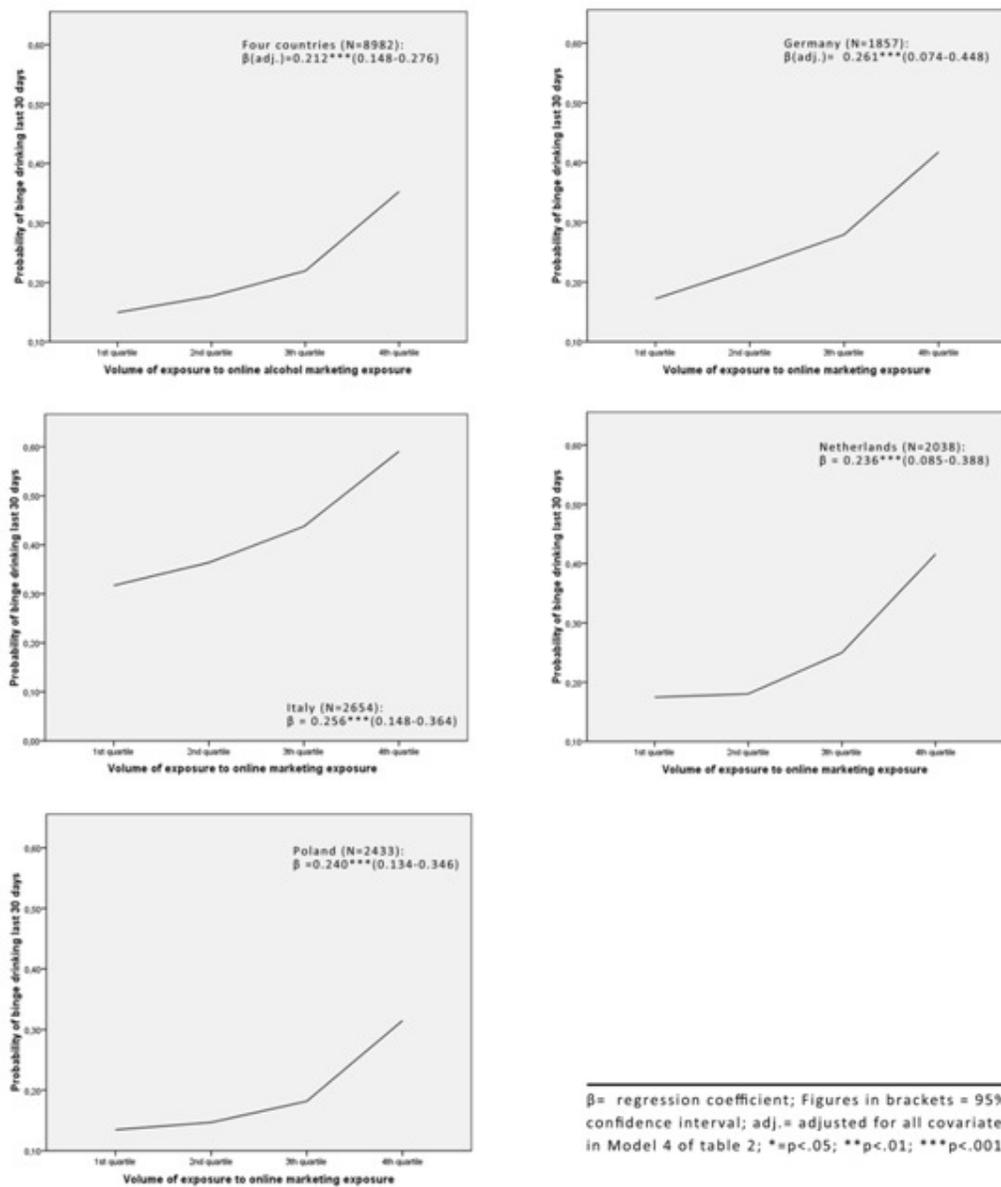
	Model 1.	Model 2.	Model 3.	Model 4.
	Odds ratio (95% CI)			
Male	1.08* (0.98-1.18)	1.06 (0.96-1.17)	1.11** (1.00-1.23)	1.04 (0.94-1.16)
Age	1.25*** (1.18-1.33)	1.13*** (1.06-1.20)	1.14*** (1.08-1.22)	1.17*** (1.10-1.24)
Education	1.00 (0.94-1.07)	0.95* (0.90-1.02)	0.97 (0.91-1.03)	0.97 (0.91-1.04)
Smoking	2.47*** (2.30-2.66)	1.84*** (1.71-1.99)	1.81*** (1.68-1.95)	1.74*** (1.61-1.89)
Restrictions Religion	0.95** (0.91-0.99)	1.00 (0.96-1.05)	1.00 (0.96-1.05)	1.01 (0.97-1.06)
Alcohol use peers		1.35*** (1.31-1.39)	1.34*** (1.30-1.38)	1.31*** (1.27-1.36)
Alcohol use mother		1.12 (1.07-1.17)	1.12*** (1.07-1.18)	1.12*** (1.07-1.17)
Permission peers		1.30*** (1.24-1.37)	1.29*** (1.23-1.36)	1.27*** (1.20-1.34)
Permission mother		0.89*** (0.76-1.04)	0.89 (0.80-1.04)	0.87* (0.75-1.02)
Internet use			1.11*** (1.08-1.16)	1.09*** (1.05-1.14)
TV non-alcohol ad exposure			1.07** (1.03-1.13)	1.03 (0.97-1.09)
TV alcohol ad exposure				1.20* (0.95-1.52)
Ownership ABI				1.15*** (1.05-1.26)
Online alcohol ad exposure				1.24*** (1.16-1.32)
N	9032	8997	8996	8982
R2	0.32	0.50	0.51	0.52
CFI	1.00	1.00	1.00	1.00
RMSEA	0.00	0.00	0.00	0.00

\*\*\*p&lt;.001; \*\*p&lt;.01; \*p&lt;.05. Adjusted for all predictors shown in the table. CI: 95% confidence interval

Table 2 presents binary logistic regression odds ratios of onset of recent binge drinking. Higher exposure to online alcohol advertising increased the odds of being a recent binge drinker, while adjusting for all the listed confounders. Positive associations were also found for ownership of alcohol-branded items and higher exposure to televised alcohol advertising.

We found few between-country differences in the strength of the adjusted relationship between online alcohol marketing exposure and onset of binge drinking. Figure 1 shows the B coefficients for the relationship between online alcohol marketing exposure (expressed in quartiles) and predicted probability of onset of recent binge drinking, adjusted for all confounders, overall and by country. The graphs indicate a dose-response relationship between online alcohol marketing exposure and the probability of recent binge drinking ( $p < .01$ ) in all countries.

Figure 1. Predicted probability of onset of binge drinking in last 30 days by different levels of exposure to online alcohol marketing (adjusted for covariates)



### What does this mean?

The frequency of exposure to alcohol marketing was found to be associated with risky drinking behaviour, even when media use, like hours spent using the internet, and demographic and social factors were controlled for. Not only was the impact significant, its effect size was also substantial when compared to the impact of other factors. In general, only the influence of peers and smoking was found to be stronger predictors of alcohol use. The association of alcohol-branded online marketing exposure and recent binge drinking was found to be consistent in all measures of risky drinking behaviour examined (onset of drinking, onset of binge drinking, and volume of alcohol consumed among those who already drink). This finding is in line with other studies that examined the impact of exposure to online alcohol marketing on adolescents' drinking (Gordon et al., 2010, 2011; Lin et al., 2011; Jones & Magee, 2011). To our knowledge, this is the first study that has examined the impact of several different levels of exposure to online alcohol marketing practices and the first cross-country study that examined the impact of alcohol advertising on adolescents drinking.

A limitation of this study is the measurement of online alcohol marketing exposure (and ownership of alcohol-branded items) by self-reported exposure only. Responses on this memory-based measures can be strongly affected by the interpretation of the respondent, and can be highly correlated to potential confounders, such as past drinking experience (Stacy et al., 2004) in the sense that drinkers may be more familiar with the product and may memorize alcohol advertisements better. This brings us to the most important limitation of this study: the use of cross-sectional data. We cannot rule out the possibility that higher reported online alcohol marketing exposure is a result of drinking experience.

Our data on the frequency of exposure to online alcohol marketing among respondents indicate the degree in which alcohol producers are able to reach young people at a very vulnerable age. For example, Heineken and Google have started a global partnership which increases the international beer producer's YouTube activity. This deal, made in 2011, will very likely mean that at least 103 million minors around the world are being exposed to the harmful effects of alcohol marketing on a monthly basis (EUCAM, 2011).

As in most countries, the volume of alcohol marketing on the internet is not regulated by law in the countries in our study. These countries rely on self-regulation, which seems to be unable to protect young people from high exposure to alcohol marketing on the internet, nor protect them against the harmful impact of this exposure on their drinking. Results of this study show a need for governments to seriously address this issue and to limit the volume of alcohol marketing in digital media by legislation.

The cross-sectional data analyses presented here suggest that higher exposure to online alcohol marketing was found to be associated with recent binge drinking. This finding was robust after controlling for media use, demographic and social factors. Consequently alcohol marketing on the internet (as with alcohol marketing practices in other channels) can be seen as a serious but avoidable threat to adolescents' health. The consistency of this effect among the four European countries and its effect size seriously raises the demand for legal restrictions of the volume of alcohol marketing in online media in European countries, and at a pan-European level.

### Take home messages

1. European youngsters from various countries are highly aware of alcohol marketing on the internet.
2. European youngsters report high exposure to online alcohol marketing.
3. These cross-sectional findings indicate that higher exposure to online alcohol marketing is associated with higher odds of being a binge drinker.
4. The findings indicate a dose-response effect: the association with binge drinking becomes stronger with high levels of exposure to online alcohol marketing. This effect seems robust and consistent in various national contexts.
5. Results of the analysis give reason to support a ban on online alcohol marketing to protect youngsters from the harmful effects of exposure to commercial communications, and more specifically online alcohol marketing.

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### Conflict of Interest Statement

Avalon de Bruijn has no conflicts of interest to declare.

### References

- Anderson P, de Bruijn A, Angus K, Gordon R, & Hastings G (2009) Impact of alcohol advertising and media exposure on adolescent alcohol use: a systematic review of longitudinal studies. *Alcohol Alcohol*, 44(3), 229-243.
- CAMY (2012) [http://www.camy.org/research/Summary\\_Brochures/CAMY\\_DigitalMedia2.pdf](http://www.camy.org/research/Summary_Brochures/CAMY_DigitalMedia2.pdf). Visited on May 30, 2012.
- Gordon R, Harris F, Marie Mackintosh A & Moodie C (2010) Assessing the cumulative impact of alcohol marketing on young people's drinking: Cross-sectional data findings. *Addiction Research & Theory*, 19(1), 66-75.
- Gordon R, Harris F, Marie Mackintosh A & Moodie C (2011) Assessing the cumulative impact of alcohol marketing on young people's drinking: Cross-sectional data findings. *Addiction Research & Theory*, 19(1), 66-75.
- Gordon R, MacKintosh A & Moodie C (2010) The impact of alcohol marketing on youth drinking behaviour: a two-stage cohort study. *Alcohol and Alcoholism*, 45(5), 470-480.

- Hellman M, Gosselt J, Pietruszka M, Rolando S, Rossetti S, & Wothge J (2011) Interpretations of Individualistic and Collectivistic Drinking Messages in Beer Commercials by Teenagers from Five European Countries. *Cross-Cultural Communication*, 6(4), 40-57.
- Henriksen L, Feighery EC, Schleicher NC & Fortmann SP (2008) Receptivity to alcohol marketing predicts initiation of alcohol use. *J Adolesc Health*, 42(1), 28-35.
- Hibell B, Guttormsson U, Ahlström S, Balakireva O, Bjarnason Y, Kokkevi A, Kraus L (2012) *The 2011 ESPAD Report*. Stockholm: Modintryckoffset AB.
- Hibell B, Guttormsson U, Ahlström S, Balakireva O, Bjarnason Y, Kokkevi A, Kraus L (2009) *The 2007 ESPAD Report*. Stockholm: Modintryckoffset AB.
- Jones SC & Magee CA (2011) Exposure to alcohol advertising and alcohol consumption among Australian adolescents. *Alcohol and Alcoholism*, 46(5), 630-637.
- Lin EY, Caswell S, You RQ & Huckle T (2011) Engagement with alcohol marketing and early brand allegiance in relation to early years of drinking. *Addiction Research & Theory*, Published online 1 December 2011(0), 1-10.
- McCambridge J, McAlaney J & Rowe R (2011) Adult consequences of late adolescent alcohol consumption: a systematic review of cohort studies. *PLoS medicine*, 8(2), e1000413.
- Nicholls J (2012) Everyday, Everywhere: Alcohol Marketing and Social Media, Current Trends. *Alcohol and Alcoholism*, 47(4), 486-493.
- Smith LA & Foxcroft DR (2009) The effect of alcohol advertising, marketing and portrayal on drinking behaviour in young people: systematic review of prospective cohort studies. *BMC Public Health*, 9, 51.
- Stacy AW, Zogg JB, Unger JB & Dent CW (2004) Exposure to televised alcohol ads and subsequent adolescent alcohol use. *Am J Health Behav*, 28(6), 498-509.
- Wechsler H, Davenport A, Dowdall G, Moeykens B & Castillo S (1994) Health and behavioral consequences of binge drinking in college. *JAMA: the journal of the American Medical Association*, 272(21), 1672-1677.
- Wechsler H & Nelson TF (2001) Binge drinking and the American college students: What's five drinks? *Psychology of Addictive Behaviors*, 15(4), 287.