

Article

Association Between Young Australian's Drinking Behaviours and Their Interactions With Alcohol Brands on Facebook: Results of an Online Survey

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Abstract

Aims: To examine the association of alcohol-brand social networking pages and Facebook users' drinking attitudes and behaviours.

Methods: Cross-sectional, self-report data were obtained from a convenience sample of 283 Australian Facebook users aged 16–24 years via an online survey.

Results: More than half of the respondents reported using Facebook for more than an hour daily. While only 20% had actively interacted with an alcohol brand on Facebook, we found a significant association between this active interaction and alcohol consumption, and a strong association between engagement with alcohol brands on Facebook and problematic drinking.

Conclusions: The findings of this study demonstrate the need for further research into the complex interaction between social networking and alcohol consumption, and add support to calls for effective regulation of alcohol marketing on social network platforms.

INTRODUCTION

'Digital is a pull medium, which is a great advantage at a time when the push side of the business model is under threat from increasing regulation' (Paul Cornell, Guinness marketing manager) (Carter, 2010).

Since its launch in 2004, Facebook has experienced exponential growth. By its tenth birthday, Facebook had 1.23 billion monthly users worldwide, including 12 million users in Australia, the majority of whom were using the site every day and doing so via a mobile device (Ross, 2014).

In the period December 2010 to May 2011, among young Internet users in the UK, 39% of males and 48% of females aged 6–14 years used Facebook, increasing to 89% of males and 91% of females aged 15–24 years (Winpenny *et al.*, 2014). This equated to an average of

1631 million impressions among 6–14 year olds and 5499 million impressions among 15–24 year olds per month in the UK alone.

Similar to other social networking sites (SNS), Facebook allows users to build public profiles and make connections with other users in their social network (Boyd and Ellison, 2008). SNS are characteristically commercial interfaces, providing innovative means of marketing to young people based on their interests and developing virtual relationships between users and brands (Goodwin, 2011; Nicholls, 2012).

Alcohol marketing on Facebook

The alcohol industry is clearly aware of the massive potential SNS offer them in providing for two-way communication with this lucrative target market. Nicholls (2012) cites several examples, including

Bacardi announcing in 2011 that it would shift up to 90% of its digital marketing expenditure to Facebook; and Diageo reporting in 2011 that their Facebook fanbase had increased from 3.5 million to 12 million in a year and that they were about to increase their 'multi-million dollar partnership' with Facebook. Nhean *et al.* (2014) cite articles from the trade press which include New Belgium estimating that its Facebook fans are responsible for 50% of its sales and Diageo reporting that Facebook ads and promotions increased its sales of Smirnoff and Baileys by 20%.

Diageo representatives were quoted in the UK press as stating that Smirnoff had become 'the number one beverage alcohol brand on Facebook worldwide', in the US its brands had experienced a 20% increase in sales 'as a result of Facebook activity', and that the deal would 'drive unprecedented levels of integration and joint business planning, and experimentation between the two companies' (Boseley, 2014). Demonstrating the success of this partnership, in July 2014 Facebook announced the appointment of Smirnoff's VP-global marketing as their head of global agency marketing (Schultz, 2014); in the same month Facebook's Vice President for Europe, the Middle East and Africa was appointed to Diageo's Board (Bouckley, 2014). Even before signing the deal, Diageo had demonstrated the massive impact of Facebook on sales; featuring as a case study in the Digital Training Academy, with a 19% increase in total sales among those exposed to Diageo's Premium Ads on Facebook in 2010 (Digital Training Academy, nd). Diageo now features as a 'Success Story' in Facebook's 'Facebook for Business'; for example, citing Diageo's decision to focus on Facebook for the Australian launch of Smirnoff Double Black in Australia (Facebook, 2015). This strategy is described as reaching over one million 18–24 year olds in just 4 weeks, and being seven times more cost-efficient at driving trial intent than any other online channel.

There is a rapidly-growing body of literature on the prevalence of alcohol-brand profiles on Facebook, demonstrating the scale of the potential of exposure of young people to this form of marketing. A UK study of 12 alcohol brands (the three top brands in each of four alcohol categories) found that all 12 had an official Facebook page (with 'likes' ranging from 1290 to 1 892 575) and six had a Twitter account (Nicholls, 2012). Common activities were real-world event tie-ins, interactive games, sponsored online events and posts encouraging consumption. In the US a systematic Internet search for 898 alcohol brands identified a total of 1017 official (i.e. company-sponsored) alcohol-brand profiles, with the top two brands having 52 (Smirnoff) and 48 (Johnnie Walker) profiles (Nhean *et al.*, 2014).

Alcohol marketing has been found to be associated with higher levels of alcohol consumption and heavier drinking among adolescents and young adults (Anderson *et al.*, 2009; Smith and Foxcroft, 2009), and the viral nature of SNS intensifies exposure to this type of marketing. Alcohol marketing via SNS utilizes young people's innate desires to share images and stories of their lives, including alcohol-related activities and events (McCreanor *et al.*, 2013). Exposure to alcohol marketing on sites such as Facebook creates an environment supportive of (excessive) alcohol consumption (Griffiths and Casswell, 2010). More recent research also shows an association between adolescents' use of electronic media communication with friends and alcohol use (Gommans *et al.*, 2015).

The very nature of social networking blurs the lines between commercial and non-commercial content to such an extent that it is increasingly impossible to identify what is 'marketing' and what is spontaneous communication between 'friends'. A study in the US found, in addition to official alcohol-brand Facebook pages, numerous user-generated pages utilizing trademarked alcohol brands with impunity (Mart *et al.*, 2009), perhaps suggesting that brands are

happy for these breaches of their copyright to continue unabated. As Carah *et al.* (2014) describe, 'Facebook users produce the identities, cultural practices and social relations within which brands are embedded' (p.262).

The potential of SNS is clearly recognized by the alcohol and advertising industries. Indeed, the marketing literature suggests that 'the opportunities that social media offer are especially crucial for alcohol products, which need to find more effective and efficient ways to reach customers . . . and need to engage with and mobilize advocates—ordinary people who are willing to speak up about the issues, ideas and brands they care about' (Uzunoglu and Oksuz, 2014, p. 275)

Regulation of alcohol marketing on Facebook

In Australia, online alcohol marketing is currently subject to self-regulation by the alcohol industry through the Alcohol Beverages Advertising (and Packaging) Code [hereafter referred to as 'the Code']. The fact that the Code covers *all posts* on an alcohol-brand's Facebook page was only confirmed in 2012, when the Advertising Standards Bureau ruled that an advertiser's Facebook site is a marketing communication tool and therefore falls under the Code and that this applies to 'the content generated by the advertisers as well as material or comments posted by users or friends'. However, it has been argued in the past that the continuing focus on the interpretation of individual communications and banning of specific messages is inappropriate (even in the context of traditional media) as these messages are cumulative and contextual. Such an approach is even more ineffective and inappropriate in the context of social media where brands and consumers interact to create and amplify messages (Brodmerkel and Carah, 2013).

DISCUS (a trade group of large, global spirits producers and the US spirit industry's self-regulator) revised its code of practice for digital marketing in 2011; and in the same year the United Kingdom's Committee on Alcohol Practice extended its regulations to include digital communications, and the Portman Group commenced a consultation on the need for more effective guidelines on social media usage. However, as with Australia, the concern with such responses is that simply extending guidelines that were developed for traditional media ignores the unique aspects and challenges of digital marketing (Hastings *et al.*, 2010; Nicholls, 2012; Hastings and Sheron, 2013). It is also important to note that studies from Australia (Jones and Donovan, 2002; Jones *et al.*, 2008), the US (Babor *et al.*, 2010, 2013), the UK (Hastings *et al.*, 2010) and other countries (Fortin and Rempel, 2007; Vendrame *et al.*, 2015) have consistently demonstrated that industry self-regulation of alcohol advertising in traditional media is ineffective.

Purpose of the study

Decades of research have provided an understanding of the impacts of traditional alcohol marketing on young people's drinking. However, while there is a growing knowledge of the nature and extent of online marketing strategies like SNS, there remain gaps in our understanding of their impact on drinking attitudes and behaviours.

This study aimed to explore among a group of young Australian Facebook users (aged 16–24 years): Facebook use; alcohol consumption; exposure to, and interaction with, advertising and branding on Facebook. As this was exploratory, there were no hypotheses for this part of the study. The secondary aim was to investigate associations between interactions with alcohol brands and alcohol consumption. Based on previous (primarily trade) literature which shows an association between Facebook promotion and alcohol sales, and research into other forms of alcohol marketing which show an

association between exposure to/interaction with alcohol marketing and increased drinking, we hypothesized that:

- H1: Those who interact with alcohol brands on Facebook will report more frequent alcohol consumption
 H2: Those who interact with alcohol brands on Facebook will report higher levels of alcohol consumption
 H1: Those who interact with alcohol brands on Facebook will report more frequent binge drinking

METHODS

Participants

A convenience sample of participants for an online survey were recruited via a market research panel, iView (www.iview.com.au), in March 2013. Of the 359 respondents, 283 reported they were current users of Facebook and were included in the analysis.

Materials

Demographic characteristics including age, gender, country of birth, education and employment were collected. Facebook attitude and usage questions included the amount of time they spent on Facebook, the number of friends they had on Facebook and their attitudes towards Facebook (using items adapted from the Facebook Questionnaire (Ross *et al.*, 2009)).

Facebook advertising questions included recalled exposure to advertising for nine different product categories on Facebook, attitudes towards Facebook advertising (using six items developed to assess attitudes towards SNS advertising for a study examining motivations for using SNS from a marketing point of view (Soares *et al.*, 2012)). Facebook alcohol advertising measures included recalled exposure to alcohol marketing on Facebook and any interaction with alcohol brands on Facebook (e.g. liking, commenting). Finally respondents reported their alcohol use (frequency, amount and binge drinking) and completed the 10-item Alcohol Use Disorders Identification Test (AUDIT) (Babor *et al.*, 2001).

Statistical analysis

Descriptive analyses were conducted to look at overall patterns of the survey data. Statistical analyses were conducted to examine the relationship between Facebook use and alcohol consumption patterns, with analyses implemented in two stages. Bivariate analyses were conducted to investigate the extent to which the distribution of one categorical variable was associated with the distribution of another; for example, to test the association between the distribution of the amount of time per week using Facebook (<1 h, 1–3 h and >3 h) and alcohol use amount (1–2 drinks, 3–4 drinks and more than 5 drinks).

Second, multivariate analyses were carried out to identify the correlates of alcohol use. Three ordered logistic regression models were constructed for the three primary ordinal-level alcohol use variables (alcohol use frequency, alcohol use amount and binge drinking frequency). In the regression models, these alcohol use variables were regressed on potential predictor variables including socio-demographics and interaction with alcohol brands on Facebook. In determining the predictors of each regression model, we used a model-building approach advocated by Hosmer and Lemeshow (2000). We assessed each potential predictor in a cross-tabulation with each outcome (i.e. χ^2 test) and set a level of significance to a fairly liberal value of $P = 0.20$, then retained only those predictors that were statistically significant at $P < 0.20$ for later multivariate analyses. By doing so we

identified possible predictors to be included in each regression model: visiting a Facebook page for an alcohol brand/product, interacting with alcohol brands on Facebook, clicking on a link from Facebook to an alcohol website, having any alcohol-related 'interests' listed on Facebook profile and viewing an event sponsored by an alcohol company. In addition to these variables, five socio-demographic variables were added to the models (gender, age, education, employment and country of birth) as control variables. The analyses were run in Stata version 10.0 and yielded Odds Ratios and 95% Confidence Intervals (CI) to assess the relationships between the predictor variables and alcohol use. Listwise-deletion approach was employed to handle missing data.

RESULTS

Demographics

The majority of the 283 respondents were female (71.7%) and all were aged 16–24 years (19.1% were under 18 years, the legal alcohol purchase age in Australia). One-fifth (21%) were employed full-time and 86% were born in Australia (Table 1). As of the 2011 Australian Census, 25% of 15–24 year olds were employed full-time and 77.0% were Australian-born (Australian Bureau of Statistics, 2011); thus our sample under-represents those young people born outside of Australia.

Alcohol-related behaviours

Just over one-fifth (22%) reported that they were non-drinkers, including 12 respondents aged less than 18 years. Of those who drank alcohol ('drinkers', $n = 220$), approximately half (48.2%) reported that on a 'typical day' when they are drinking they would consume 1–2 standard drinks, with 24.1% reporting 3–4 standard drinks and 27.8% five or more. Slightly less than one-third of the drinkers reported that they never drink more than six standard drinks on a single occasion, with 43.2% reporting doing so less than monthly and 27.2% monthly or more. Those under 18 years were less likely to report high levels of alcohol consumption.

A score for the AUDIT was calculated for each respondent with complete data ($n = 217$). The majority (67.7%) of respondents scored less than eight. Of the 32.3% with scores of 8 or more, indicating possible alcohol dependence and hazardous and harmful alcohol use, nine

Table 1. Respondent demographics ($n = 283$)

Characteristics	%	(N)
Gender		
Female	71.7	(203)
Male	28.3	(80)
Education		
Below year 10	0.4	(1)
Year 10/11	21.9	(62)
Year 12	29.0	(82)
TAFE or equivalent	22.6	(64)
Bachelor degree or above	26.1	(74)
Employment		
Not currently employed	36.4	(103)
Casual work	25.1	(71)
Part-time	17.7	(50)
Full-time	20.8	(59)
Country of birth		
Australia	85.9	(243)
Others	14.1	(40)

had scores from 16 to 19 (indicating a high level of drinking problems), and 16 had scores of 20 or more also (indicating high level drinking problems and the need for further diagnostic evaluation for alcohol dependence).

Facebook use, number of Facebook friends and attitude toward Facebook

All respondents ($n = 283$) were asked questions about (a) time spent on Facebook, (b) number of friends and (c) how many pages they 'liked'. More than half of the respondents (59.3%) reported using Facebook for more than an hour daily, and only 23% for 30 min or less; this is consistent with national data that the 'typical' Facebook user spends more than 8.5 h per week on Facebook (Sensis, 2014). The majority (76.7%) reported they had more than 100 Facebook friends, and 23.3% more than 400. In addition 62.9% reported that they 'liked' more than 13 Facebook pages.

Of the five attitudinal items, the highest mean score was for 'Facebook is part of my everyday activity' (3.9, on a 1–5 scale, indicating a level of agreement); followed by 'I am proud to tell people I'm on Facebook', 'I would be sorry if Facebook shut down', (both mean score of 3.5), 'I feel out of touch when I haven't logged on' (3.4) and 'I feel I am part of the Facebook community' (3.3). The proportion of respondents who responded affirmatively was particularly high for the statement 'Facebook is part of my everyday activity' (72.8%). A composite score for the five items of the attitude scale showed a mean score of 3.53 (SD = 0.91), indicating a positive attitude towards Facebook.

Exposure to, and views regarding, Facebook advertisements

Respondents were given a list of different types of advertisements that appear on Facebook and asked to indicate whether they saw these types of advertisements in a typical week, as well as how often they clicked on these types of advertisements. The most common types of Facebook advertisements reported as being seen in a typical week were for clothing (53.0%) followed by shoes (42.4%), weight loss products (41.3%), technology (32.2%) and health/sports equipment (26.9%). A smaller proportion (16.3%) reported that they see alcohol advertisements in a typical week.

More than half (55.1%) said they never clicked on Facebook advertisements, and only 3.9% said they often or always did so. The most common types of advertisements they reported clicking on were clothing (25.8%), competitions (25.4%) and shoes (17.7%). Consistent with the lower proportion reporting seeing alcohol advertisements on Facebook, only 5.3% reported clicking on these. Respondents were most likely to report that they typically do not pay attention to, or ignore, Facebook advertisements (mean scores of 3.8 and 3.4 respectively on a 5-point scale); and that they find these advertisements boring (3.5) but see them as a necessary evil for funding the social network (3.4). They did not agree that advertising adds value to their use of Facebook (2.2) but were largely neutral about its impact on their willingness to use Facebook (2.8).

Exposure to alcohol advertising and branding on Facebook

Fourteen percent of respondents said they had seen advertisements for alcohol brands on Facebook over the past month (slightly lower than the 16.3% who reported seeing them in a 'typical' week). Of those who reported that they had seen alcohol advertisements on Facebook, the majority (87.5%) reported seeing between one and four such

advertisements during the past month and the remaining 12.5% from five to eight.

One in five respondents (20.8%) reported that they had visited an alcohol page (including 10.2% of those aged under 18 years), with the majority having visited between one and four such pages (86.4% of those who has done so). The main reasons given for visiting an alcohol brand's Facebook page were to find out about a competition (12.4%, $n = 35$), because they enjoy drinking the product (11.3%, $n = 32$), and because they saw a friend's comment or post (8.1%, $n = 23$).

Interaction with alcohol advertising and branding on Facebook

The most commonly reported interaction with alcohol advertising or brands on Facebook was uploading or tagging a photo with an alcohol product in it (30.7%), followed by liking something posted by an alcohol brand or product on Facebook (17.7%), viewing an event created/sponsored by an alcohol company (13.4%), clicking on a link from Facebook to an alcohol website (11.0%) and listing an 'interest' on their profile related to alcohol (11.0%). Significantly fewer had commented, posted or used an alcohol-branded app (see Table 2).

The types of alcohol company posts respondents were most likely to report 'liking' were those related to a product they like (11.3%), a funny comment or photo (8.8%) or an ad or promotional campaign (5.3%) (Adds to more than 17.7% as respondents could select multiple responses). Photos with an alcohol product that respondents had uploaded or tagged on Facebook were primarily of themselves or their friends getting drunk (19.4%), products they like (13.4%) or events (12.0%).

Associations between alcohol consumption and alcohol-related interactions on Facebook

Drinking frequency

Bivariate analyses found no significant associations between Facebook use (amount of time using Facebook or number of Facebook friends) and frequency of alcohol consumption; and no association between the number of times respondents reported clicking on a Facebook advertisement and frequency of alcohol consumption. However, bivariate analyses showed a significant association between interaction with alcohol brands on Facebook (that is liking, posting, commenting on an alcohol-brand's Facebook page, or uploading/tagging a photo with alcohol product) and reported frequency of alcohol consumption ($\chi^2 = 29.177$, $P < 0.001$). Across the individual behaviours, frequency of alcohol use was higher among those who had visited an alcohol-brand's Facebook page ($\chi^2 = 14.036$, $P = 0.001$); clicked on a link from

Table 2. Respondents' interaction with alcohol advertising and branding on Facebook

Have you ever. . .	% (n)
Uploaded or tagged a photo with an alcohol product in it?	30.7% (87)
Liked something posted by an alcohol brand or product on Facebook?	17.7% (50)
Viewed an event created/sponsored by an alcohol company?	13.4% (38)
Clicked on a link from Facebook to an alcohol website?	11.0% (31)
Listed an 'interest' on your profile related to alcohol?	11.0% (31)
Commented on something posted by an alcohol company on Facebook?	6.7% (19)
Posted something on a page for an alcohol product?	4.6% (13)
Used an alcohol-branded app on Facebook?	2.5% (7)

Facebook to an alcohol website ($\chi^2 = 8.913$, $P = 0.012$); listed an 'interest' on their profile related to alcohol ($\chi^2 = 7.462$, $P = 0.024$); viewed an event created/sponsored by an alcohol company ($\chi^2 = 14.157$, $P = 0.001$). Thus, H1 was supported.

The regression analysis revealed that engaging with activities on Facebook (liking, posting, commenting or uploading/tagging) was significantly and positively associated with alcohol use frequency (odds ratio = 2.03, $P = 0.010$). That is, the odds of being in a higher alcohol use frequency category (e.g. 2 or more times per month) for respondents who had ever engaged in activities on Facebook was double that for those who had never done so, when the other variables in the model were held constant. Two demographic variables, education and employment, were significantly associated with alcohol use frequency (see Table 3).

Drinking volume

As with drinking frequency, bivariate analyses found no significant associations between Facebook use and quantity of alcohol consumed on a typical day of drinking. However, again consistent with the findings for drinking frequency, there was a significant association between interaction with alcohol brands on Facebook and typical drinking quantity ($\chi^2 = 19.901$, $P < 0.001$). Typical quantity of alcohol consumed was also higher among those who had listed an 'interest' on their profile related to alcohol ($\chi^2 = 9.449$, $P = 0.009$). There was no association between typical quantity consumed and having visited an alcohol-brand's Facebook page, clicked on a link from Facebook to an alcohol website, or viewed an event created/sponsored by an alcohol company.

Table 3. Multivariate associations between selected characteristics and alcohol use frequency

Characteristics	Odds ratio	(95% CI)	P
Male vs. Female	1.349	0.789–2.307	0.274
Age	1.110	1.00–1.230	0.049
Education			
Year 12 (vs. Year 11 or below)	2.453	1.250–4.813	0.009
TAFE (vs. Year 11 or below)	1.863	0.847–4.097	0.122
Bachelor + (vs. Year 11 or below)	2.302	0.962–5.510	0.061
Employment			
Casual work (vs. Not working)	1.914	1.053–3.477	0.033
Part-time (vs. Not working)	1.737	0.854–3.531	0.127
Full-time (vs. Not working)	2.872	1.378–5.988	0.005
Country of birth			
Australia (vs. Others)	1.312	0.665–2.590	0.433
Interaction with alcohol brands on Facebook (vs. Never)			
Ever liked, posted, commented or uploaded/tagged on Facebook	2.030	1.185–3.477	0.010
Ever clicked on a link from Facebook to alcohol website	1.289	0.502–3.3106	0.598
Have any 'interests' listed on profiles on Facebook	1.181	0.526–2.651	0.686
Viewed an event sponsored by alcohol company	2.308	0.991–5.376	0.052
Ever visited a Facebook page for alcohol brand/product	1.551	0.792–3.036	0.200

Note: The regression analysis used an ordinal outcome, alcohol use frequency consisting of three level categories 'never,' 'monthly or less,' and '2 or more times a month.'

The regression analysis revealed an even stronger association between engaging with activities on Facebook (liking, posting, commenting or uploading/tagging) and alcohol use quantity than for frequency (odds ratio = 3.711, $P < 0.001$); that is, the odds of being in a higher alcohol use amount category (e.g. 5 or more drinks) for respondents who had ever engaged in activities on Facebook was ~3.7 times greater than those who had never done so (Table 4). The only socio-demographic variable related to usual drinking quantity was country of birth (odds ratio = 2.459, $P = 0.034$). Thus, H2 was supported.

The regression analysis also revealed a significant association between engagement in activities on Facebook (ever liked, posted, commented or uploaded/tagged) and heavy episodic ('binge') drinking (odds ratio = 2.407, $P = 0.002$); that is, the odds of being in a higher heavy episodic drinking category (monthly or weekly) was about 2.4 times greater among those who had engaged in these activities (Table 5). Thus, H3 was supported. None of socio-demographic variables were significantly associated with heavy episodic drinking (Table 5).

DISCUSSION

Our findings in relation to Facebook use are consistent with other studies; approximately 60% of these young Facebook users reported that they spent more than an hour per day using Facebook, and 80% reported that they had more than 100 friends in their Facebook networks. They also had overall positive attitude toward Facebook as measured on five attitudinal statements, and were particularly likely to agree that Facebook is part of their everyday activity. We found no significant associations between Facebook use (amount of time using Facebook or number of Facebook friends) and frequency of alcohol consumption, suggesting that there is not a direct relationship between Facebook use and drinking behaviours.

Table 4. Multivariate associations between selected characteristics and alcohol use amount

Characteristics	Odds ratio	(95% CI)	P
Male	1.660	0.903–3.051	0.103
Age	1.095	0.968–1.240	0.150
Education			
Year 12 (vs. Year 11 or below)	1.316	0.544–3.185	0.543
TAFE (vs. Year 11 or below)	1.198	0.473–3.032	0.703
Bachelor + (vs. Year 11 or below)	0.667	0.245–1.815	0.428
Employment			
Casual work (vs. Not working)	1.417	0.686–2.926	0.346
Part-time (vs. Not working)	0.992	0.441–2.235	0.985
Full-time (vs. Not working)	1.804	0.836–3.894	0.133
Country of birth			
Australia (vs. Others)	2.459	1.071–5.646	0.034
Interaction with alcohol brands on Facebook (vs. Never)			
Ever liked, posted, commented or uploaded/tagged on Facebook (vs. Never)	3.711	2.052–6.713	<0.001
Ever clicked on a link from Facebook to alcohol website	0.504	0.219–1.161	0.108
Have any 'interests' listed on profiles on Facebook	2.116	0.958–4.673	0.064

Note: The regression analysis used an ordinal outcome, alcohol use amount consisting of three level categories '1–2 drinks,' '3–4 drinks,' and '5 or more drinks.'

Table 5. Multivariate associations between selected characteristics and binge drinking frequency

Characteristics	Odds ratio	(95% CI)	P
Male	1.729	0.970–3.082	0.064
Age	1.121	0.997–1.260	0.056
Education			
Year 12 (vs. Year 11 or below)	0.896	0.390–2.057	0.795
TAFE (vs. Year 11 or below)	0.732	0.301–1.781	0.491
Bachelor + (vs. Year 11 or below)	0.828	0.316–2.168	0.700
Employment			
Casual work (vs. Not working)	1.203	0.614–2.358	0.589
Part-time (vs. Not working)	1.264	0.578–2.765	0.557
Full-time (vs. Not working)	1.033	0.489–2.183	0.933
Country of birth			
Australia (vs. Others)	1.657	0.797–3.442	0.176
Interaction with alcohol brands on Facebook			
Ever liked, posted, commented or uploaded/tagged on Facebook	2.407	1.373–4.218	0.002
Have any 'interests' listed on profiles on Facebook	1.236	0.581–2.629	0.582
Viewed an event created/sponsored by alcohol company	1.565	0.756–3.239	0.227

Note: The regression analysis used an ordinal outcome, binge drinking frequency consisting of three level categories 'never,' 'less than monthly,' and 'monthly or weekly.'

We found that a minority of respondents recalled seeing alcohol advertisements on Facebook, and only one-fifth reported that they had visited a Facebook page of an alcohol brand/product. This passive exposure to alcohol-brand advertising was not in itself significantly associated with alcohol use. However, it is important to remember that alcohol marketing is not a series of one off exposures that each has their own discrete impact. Rather, alcohol marketing is multi-faceted and ubiquitous, and increasingly embedded in young people's lives; it is this cumulative exposure to a plethora of alcohol marketing that has previously been shown to be related to alcohol consumption (Ellickson *et al.*, 2005; Collins *et al.*, 2007). SNS further complicates this relationship by engaging consumers in the co-creation of marketing messages. A US study found that alcohol advertising (in and of itself) on Facebook was relatively infrequent, compared with the tens of thousands of alcohol-related Pages, Applications, Events and Groups; and that only half of the Pages restricted access based on age (Mart *et al.*, 2009).

One of the notable features of Facebook is that it enables users to establish connections with other individual users as well as with organizations and companies, and provides a variety of tools to enhance interaction with other users such as liking, tagging and sharing. Our exploration of young Facebook users' interaction with alcohol brands found that uploading/tagging photos containing an alcohol product (more than 30%) and *liking* something posted by an alcohol brand (20%) were the most common interactions between these consumers and alcohol brands on Facebook.

Unlike the results for passive exposure, we found a significant association between active interaction with alcohol brands on Facebook (e.g. liking, commenting) and alcohol consumption, including binge drinking. The multivariate logistic regression analyses confirmed that respondents, who had ever *liked*, commented, posted or tagged on a Facebook page for an alcohol brand were more likely to use alcohol than those who had never engaged in those activities. This is an

important finding as it suggests that this association is larger than that between drinking and exposure to other (non-interactive) forms of alcohol marketing, as previous research has shown these associations have only been significant when exposure to multiple alcohol marketing channels are examined (Gordon *et al.*, 2010).

There is a complex, and perhaps synergistic, relationship between interaction with alcohol marketing on Facebook, user-generated commentary on alcohol consumption on Facebook and drinking behaviours. For example, a study in the US which combined surveys of undergraduate university students and analysis of their public Facebook profiles found a significant association between the display of references to intoxication/problem drinking and AUDIT scores and alcohol-related injuries (Moreno *et al.*, 2012). This finding, in conjunction with the findings of the current study, demonstrates the potential for commercial and user-generated alcohol references on Facebook to increase young Facebook users' perceptions of alcohol consumption as socially normative.

While only 20% of the respondents had actively interacted with an alcohol brand on Facebook, it is important to note that the nature of Facebook means that this underestimates the exposure of young people to alcohol marketing on this platform. Each time one of these individuals likes, shares or posts an alcohol-related messages it is visible to their Facebook friends (and the majority of these young Facebook users have more than 100 such friends). Further, these young people are therefore exposed to alcohol from one of the most powerful sources—word-of-mouth from their friends and influencers. This is particularly concerning for younger Facebook users; while those under the age of 18 are theoretically not able to access the official pages of alcohol brands, they are able to access many unofficial pages and the comments and images shared by their friends. Further, Facebook does not have a formal age verification process; in 2011, it was estimated that 30% of US minors (under 21 years) were actually under the age of 13 and had used a false date of birth to set up their Facebook page (Jernigan, 2012).

The findings of this study should be interpreted with caution given the small sample size and the use of a convenience sample of young people who had registered with an online survey panel provider. It is also important to note that the majority of the respondents were female (71.7%), all resided in a single country (Australia), and non-Australian born young people were under-represented; thus caution should be exercised in generalising the results to other populations.

CONCLUSION

While this study cannot demonstrate a causal relationship between interaction with alcohol brands and alcohol consumption, a strong association (controlling for a number of possible confounding variables) has been established. This present finding is consistent with the small but growing body of evidence on relationships between interacting with SNS and alcohol consumption behaviours (Glassman, 2012; McCreanor *et al.*, 2013). There is a need for further research into the nature, extent and effects of young people's engagement with alcohol brands on Facebook and other social media platforms. Future research should include larger sample sizes, ideally drawn from more than one country. However, given the substantial evidence of the failure of industry self-regulation of alcohol marketing in other media, and the growing use of social media by both marketers and consumers, the findings of this study support calls for pro-active consideration of the need for more effective regulation of alcohol marketing on social network platforms.

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CONFLICT OF INTEREST STATEMENT

None declared.

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