

Supplementary File 5: Summary of content research reviewed into user-created alcohol promotion

Author(s)	Digital channel(s)	Methods	Summary of findings
Atkinson et al. (2014)	Depictions of alcohol on personal Facebook profiles from past eight weeks ($n = 43$, aged 16-21 years old). UK	Textual and visual posts were thematically analysed for alcohol content, both quantitatively and qualitatively using a pre-mediated coding frame. Peer engagement was also measured through post likes.	Alcohol content appeared a normal and routine aspect of Facebook use, and received positive feedback from peers. Content was often gendered towards females and those around the legal purchasing age. Consumption was not always the primary focus, with emphasis instead on drinking occasion or context. Content was predominately visual. Displays were selective to only show fun, pleasure and positive drinking cultures. Facebook was used to create and document drinking stories and memories, particularly related to the pre-loading drinking culture. Such content appeared more prominently than marketing, with the exception of marketing for local venues.
Beullens and Schepers (2013)	Depictions of alcohol on personal Facebook profiles ($n = 160$). Belgium	Textual and visual posted were coded using a theoretically based content analysis, including demographic (e.g. sex, number of friends), interaction (e.g. comments or likes) and alcohol-depiction variables (e.g. consumption shown in positive context).	Most profiles contained alcohol references. Visual references outweighed the textual references, with images also including some reference to alcohol brands. Such references, and the peer reactions to such content, mostly referred to alcohol use in a positive context, with only a small amount depicting neural or negative connotations. Regression analyses demonstrated number of Facebook friends and status updates referring to alcohol use were significant predictors of total uploaded visual references to alcohol.
Cavazos-Rehg et al. (2014)	Sample of Tweets containing alcohol or drinking keywords between March 13th – April 11 th 2014 (<i>drunk; beer; alcohol; vodka; liquor; hangover</i>). Global	Analysed for sentiment (<i>Strongly against drinking – Strong normalises or promotes drinking</i>), theme (<i>eight pro-drinking themes and four anti-drinking themes</i>), and source (e.g. <i>bar or restaurant, media, celebrity etc.</i>)	Most tweets (79%) promoted a positive sentiment towards drinking, with pro-alcohol outnumbering anti-alcohol by a factor of more than 10. Most common pro-drinking themes included references to frequent or heavy drinking (54%), or wanting and planning to consume alcohol (25%). Most tweets came from organic non-commercial sources (87%). Anti-drinking messages mainly alluded to harm (41%) or being socially unattractive (13%). Of the anti-drinking messages most (81%) appeared to be from organic Twitter users, followed by professional or government organisations (17%)
Eagle et al. (2014)	Alcohol related smartphone applications based on searching of terms ‘ <i>alcohol</i> ’, ‘ <i>drinking</i> ’, ‘ <i>drunk</i> ’, ‘ <i>alcoholic</i> ’ and ‘ <i>alco*</i> ’ on Android GooglePlay and Apple iTunes stores.	Recorded a range of features including cost, consumption framing (<i>pro/anti</i>), age verification, app type (e.g. game), and potential target audience.	Over three quarters of the apps related to pro-consumption messages (78%), including those promoting heavy consumption (e.g. ‘Let’s get Wasted’). Of the pro-alcohol apps, 37% were designed to reinforce positive behaviour towards consumption, while 55% enabled users to track own consumption. None of the apps appeared to have effective age-verification measures. Pro-alcohol content also appeared to target health conscious and diet markets (e.g. ‘Drink Thin’) while they also appeared to have appeal to younger markets, including students (e.g. ‘ <i>Campus Beer Run</i> ’).

Egan and Moreno (2011)	Depictions of alcohol on personal Facebook profiles of male undergraduates ($n = 225$, aged 18-23 years old). USA	All visual and textual profile content was rated against a theoretically based codebook including demographics, Facebook use variables, and alcohol reference variables (e.g. activities).	Alcohol references featured on 85% of profiles, with prevalence consistent throughout undergraduate stage. The average number of references per profile was 8.5, and was positively correlated with undergraduate year. Number of references was positively associated with being above the legal drinking age, and number of Facebook friends.
Fournier and Clarke (2011)	Depictions of alcohol on personal Facebook profiles of male undergraduates ($n = 68$, aged 18-40 years old). USA	Visual and textual references on the participants' wall were coded based on whether they included alcohol related content.	Three quarters of profiles had alcohol reference (76.5%). Profiles contained a greater quantity of pictures referring to alcohol (3.2%) than textual posts (0.01%), although there was considerably variability across profiles. Participants of significant legal drinking age had a significantly higher number of alcohol-related references (11%) compared to those under (3%).
Griffiths and Casswell (2010)	Depictions of alcohol personal Bebo social networking profiles ($n = 150$, aged 16-18 years old). New Zealand	Cyberspace ethnography	Social networking websites reinforced or normalised consumption. Teenagers presented themselves as able to consume significant amounts of alcohol, wished to be seen as 'drunks' or associated with brands. Content included comments, photographs documenting drinking (e.g. games or taking part in challenges) and responses to online quizzes (e.g. partying personality). Some photos also showed negative aspects of drinking (e.g. vomiting or passing out), while alcohol brands could be clearly seen in others.
Koff (2013)	Sample of videos from YouTube based on college specific drinking keys (<i>college parties, frat parties, college drinking</i>) USA	Content rated against a theoretically-based codebook, including descriptive information (e.g. views), alcohol-related variables (e.g. type of alcohol visible), and positive or negative expectancies.	Videos were approximately 3 minutes long and had been viewed over quarter of a million times. That the number of likes exceeded dislikes suggested that videos were positively received. The majority referred to positive alcohol outcomes like sociability (92%) and sexuality (76%). Negative outcomes were reported in less than half of videos (48%). Content featured a range of alcohol including beer (68%) and spirits (45%). Videos also depicted other substances being used simultaneously, including illicit drugs (36%).
Kolek and Saunders (2008)	Depictions of alcohol on personal Facebook profiles of male undergraduates ($n = 464$, aged 18-40 years old). USA	A range of visual and textual profile content was rated against a theoretically based codebook including demographics, Facebook use variables, and alcohol reference variables (e.g. activities associated).	A small proportion (7%) of central photographs (e.g. profile pictures) contained clear references to alcohol, while 8% had indirect or implied references to consumption (e.g. solo cups or acting drunk). Over one-third of profiles contained a positive reference to drinking in the interests, groups or about me section and half contained at least on picture of someone consuming and alcoholic drink. Female profiles had more references than male.

Mart et al. (2009)	Depictions of alcohol on Facebook based on searches for alcohol-specific keywords (e.g. <i>alcohol</i> , <i>binge and shots</i>).	Created one underage and one overage account with 'interests' associated with alcohol. Assessed adverts, pages, applications, events, and groups on Facebook.	Adverts not related to the alcohol industry also promoted drinking. Over 500 applications were associated with alcohol terms. This mostly represented games which could be played between users (e.g. " <i>Beer Mail</i> "). Over 50,000 groups were found to be associated with general alcohol terms, including 342 with the name ' <i>Binge Drinkers</i> '. Content for all five areas could be accessed by the underage user. Such content provided de facto advertising for brands and content was not subject to robust guidelines or compliance checks.
	USA		
Moraes et al. (2014)	Depictions of alcohol on generic drinking groups (' <i>Consuming alcohol</i> ' and ' <i>Alcohol Rules</i> '). Extracted as two most popular pages from search of keywords 'Alcohol', 'booze', 'beer' and 'vodka'.	Netography data collection followed by a template analysis ethnography analysis.	Predominant focus on marketing, not user-created promotion. Findings did indicate, however, that young adults display wall comments, drinking-related group membership, events, photographs and other social communications on Facebook which leave footprints with social cues that contribute to the normalisation of alcohol consumption. Neither of the generic alcohol pages displayed a warning of the drinking age.
	UK		
Moreno et al. (2007)	Depictions of health risk behaviours on MySpace profiles ($n = 142$, age 16-17 years old).	Coded profiles for range of health risk behaviours related to substance use, personally identifiable information, and sexual behaviour.	Forty-seven percent of profiles contained health risk behaviour; 21% contained references to sexual activity, 25% described alcohol use, 9% described cigarette use, and 6% described drug use.
	USA		
Moreno et al. (2009)	Depictions of health risk behaviours on a selection of MySpace profiles used in the 30 days ($n = 500$, self-reported 18 years old).	Recorded demographic information (<i>age</i> , <i>gender</i> , <i>home state</i>), relationship information (<i>sexual orientation</i>), sexual behaviour, substance use, violence, church or religious involvement, sport or hobby interests, and explicit evidence that profile belonged to someone over 18 years old.	Over half (54%) of the 500 web profiles referenced at least one health risk behaviour. The most frequently referenced risk behaviour was substance use (41%), with 37% of all profiles specifically referencing alcohol use. This was followed by sexual activity (24%) and violence (14%). Church membership or display sporting and hobby interests was associated with reduced references to all health risk behaviour.
	USA		

Moreno et al. (2010)	<p>Depictions of alcohol on a selection of MySpace profiles ($n = 400$, aged 17-20 year olds).</p> <p>USA, Washington: DC.</p>	<p>Content coded for explicit versus figurative alcohol use and alcohol-related motivations, associations and consequences, including references to CRAFT problem drinking criteria.</p>	<p>Over half contained alcohol references (56%), particularly males (54%) and those from a white background (70%). Most references were textual (62%) not visual (38%). The most common reference was explicit use (49%), while 17% referenced explicit intoxication. The most common displayed motivation was peer pressure (5%). The most frequently association was dancing or partying (22%). The most commonly displayed consequence was negative physical consequences (2%). Only a small proportion of references met the CRAFT criteria for problematic alcohol use (3%), with the most frequent being blacking out or forgetting events while intoxicated.</p>
Moreno et al. (2012)	<p>Displayed references to alcohol on college students Facebook profiles ($n = 224$, aged 18-20 years old).</p> <p>USA.</p>	<p>Theoretically derived code book used to categorise profiles into ‘non-displayers’, ‘alcohol displayers’, and ‘intoxication or problem drinking displayers’.</p>	<p>Of the profiles coded, 64% were classified as ‘non-displayers’, 20% as ‘alcohol displayers’ and 16% has ‘intoxication or problem drinking displayers’. There were no difference among reference categories for age gender or between universities, although intoxication and problem drinking references were more likely to be Caucasian compared to other races.</p>
Moreno et al. (2013)	<p>References to event-specific drinking on Facebook profiles of college students ($n = 66$, aged 18-19 years old).</p> <p>USA.</p>	<p>Facebook profiles were coded one month before, during and after an event known for high levels of drinking. Recorded references to drinking at the event.</p>	<p>Among participants who made reference to the event, 27% did so before the event occurred, 17% did so on the actual day of the event, and 29% displayed afterwards. Some participants displayed in more than one time frame. The average number of references was 4.5. Photos represented the majority of references (67%), followed by status updates (21%), liking pages and groups (10%) and associating with event pages (2%).</p>
Moreno et al. (2016b)	<p>Displayed references to alcohol Facebook and Twitter of first-year college students ($n = 94$, aged 17-19 years old).</p> <p>USA.</p>	<p>Used Moreno et al. (2012) approach to code profiles as ‘non-displayers’ or ‘alcohol displayers’. Profiles coded at two points at beginning and end of college year. Also recorded social media connections (e.g. friends). Profiles evaluated over 5 months.</p>	<p>Participants were more likely to display alcohol references on Facebook (76%) compared to Twitter (34%). The average number of alcohol references was also greater on Facebook compared to Twitter. Of those who displayed alcohol references on Twitter 91% also posted such content on Facebook, while only 9% posted exclusively on Twitter.</p>

Morgan et al. (2010)	MySpace and YouTube searches for 'me' followed by 'stoned', 'wasted', 'hammered', 'weed', and 'drunk'. First 75 results included. USA.	Open coding approach to describe the content featured, whether drugs or alcohol were visible or being consumed, what the protagonists were doing, and how they were behaving.	Half of MySpace content depicted alcohol, both individually in groups. Age of those depicted was estimated to range between 15 and 24 years old. Spirits were the most frequent alcohol depicted, followed by beer. Nearly two-thirds of YouTube videos (64%) depicted consumption. Most were amateur in quality and appeared to have been taken at social events. Most alluded to drunkenness, including cognitive behaviour and impairment, although others referenced pranks and or documented alcohol consumption.
Parder and Vilhaemm (2015)	Forums about health for adolescents. Sample of 171 posts, from 1,472 posted 2008-2012. Estonia.	Thematic analysis based posts that clearly support non-drinking, posts that supported drinking and rejected non-drinking, and posts that supported negotiable and situationally varied forms of conduct in alcohol-related occasions.	Approximately 1/5 th of posts were pro-drinking, explaining the reasons for drinking to be beneficial. Moreover 1/4 th of posts supposed negotiable drinking rules, thus suggesting young peoples' rules for drinking were not completely strict. About half of the posts were supportive of non-drinking. Non-drinking at alcohol-related social gatherings was generally communicated as a non-tolerated stance which made erode the whole collective partying practice.
Posner and Wollersheim (2011)	Public Facebook groups returned for search of term 'alcohol', restricted to only Australian networks (n=167). Australia	Discourse analysis used to separate returned results in thematic categories. Content of each category analysed under headings subject positioning, object, and institutions.	Groups had sixes themes (policy, product, social activity, social association, social places and other). Each was underpinned by different subject positions, content objects, and referenced institutions. The analysis suggested a number of Facebook groups emphasised binge drinking and described beliefs and values that reinforced this behaviour. Binge drinking appeared socially accepted within groups and was presented in a positive light. Drinking reinforcement was found to often stem from peer influences, with individuals exposed to statements related to alcohol culture posted on the group's wall or discussion section.
Primack et al. (2015)	Portrayal of alcohol in YouTube videos (n = 70). Chosen from systematic search of five alcohol key words ('drunk', 'buzzed', 'hammered', 'tipsy', and 'trashed'). Global	Rated against a codebook divided into six categories; video characteristics (e.g. <i>production quality</i>), character socio-demographics (e.g. <i>ethnicity</i>), alcohol depiction (e.g. <i>type</i>), characteristics associated with use (e.g. <i>drinking games</i>), consequences (e.g. <i>physical, cognitive etc.</i>), and user sentiment (e.g. <i>views and likes</i>).	Videos had over 333 million combined views. While 89% contained males, only 49% contained females. Liquor was depicted most frequently, followed by beer. While 86% portrayed intoxication, 33% reported bingeing and 7% dependence. Humour was associated with alcohol in 79%, while games and attractiveness were reported in one-fifth. Consumption was paired alongside use of tobacco, other drugs, aggression, injury and use of a motor-vehicle. Consequences were mostly positive, followed by social and sexual. The strongest negative consequences were cognitive, physical legal and economic. Content was well received with more 'likes' than 'dislikes'. Videos which contained liquor, brand and physical/sexual attractive references generated more positive reaction.

Pumper and Moreno (2013)	Facebook of 1 st year college students classed as high-risk alcohol users ($n = 21$, aged 18 and 19 years old) USA.	Used Moreno et al. (2012) approach to code profiles as ‘non-displayers’, ‘alcohol displayers’, or ‘intoxication or problem drinking displayers’. Profiles coded at two points at beginning and end of college year.	When examining the Facebook profiles of high-risk alcohol users prior to entering college over half (57%) were classed as ‘non-displayers’, while the remaining were ‘alcohol displayers’. Only one profile displayed intoxication or problematic drinking. At time two, however, over half (52%) of the profiles displayed references to intoxication or problematic drinking. A further 38% were alcohol displayers and the remaining non-displayers.
Ridout et al. (2012)	All self and other generated photos and textual wall posts linked to personal Facebook profiles of university students aged ($n = 158$, 17-24 years old).	Alcohol identity designated using an auto-photographic methodology, used to assess both self and peer-posted content across a range of features.	Alcohol identity was displayed through a range of content created by both the self and others including photographs, profile photos, exterior behaviour residue (e.g. texts alluding to activities involving alcohol conducted offline), and other directed identity claims (statements or symbols about self or self-interests, for example becoming a fan of alcohol-related pages). There was a positive correlation between number of Facebook friends and alcohol-related identity. Males had greater alcohol-identity scores than females.
Rolando et al. (2016)	Portrayal of drunkenness in YouTube videos ($n = 142$). Chosen from systematic search of five Italian generic alcohol references terms Italy	Multilayer visual ethnography.	Female drinking on YouTube is mainly interpreted as a sign of sexual willingness and is strongly stigmatised. In most cases, women themselves actively contributed to creating the sexual meaning. Even in a user-generated content medium such as YouTube, old gender stereotypes about drinking fail to be deconstructed. Conversely, the images and discourses that were analysed reinforce these stereotypes, reproducing the messages conveyed by mainstream media in an even more explicit and risky manner.
van Hoof et al. (2014)	Personal Facebook profiles ($n = 70$). Including photos, status updates, and information page.	Measured visual depictions of alcohol, or related stimuli (e.g. merchandise), both direct textual references or indirect references and identity claims (e.g. fan of alcohol brand)	Of the 71 profiles analysed, 99% contained alcohol references. Of all health-risk behaviours measured, alcohol references featured more than tobacco, drugs, and unhealthy nutrition in photos, status updates, and information pages.
Weaver et al. (2013)	Top 250 alcohol related smartphone applications based on searching of term ‘ <i>alcohol</i> ’ on Android GooglePlay and Apple iTunes stores.	Recorded type (e.g. <i>medical</i> , <i>educational</i> , <i>entertainment</i>), ranking, user-star rating, cost, seller name, framing, focus, purpose, consequences, attitudes, and recommendations.	Of the retrieved apps ($n = 384$) the majority were entertainment (50%), followed by blood-alcohol concentration (39%), and then health promotion or stop drinking apps (11%). Of the 192 entertainment apps, 35% were drinking games, 31% were recipe apps, 9% were alcohol-location aids, and 18% were other types of apps such as joke or brand-specific apps. Of the entertainment apps most projected a neutral attitudes towards alcohol and 45% had a positive attitude. Only 4% projected a negative attitude. The majority of entertainment apps were free to purpose (68%) and only a minority cost more than \$1 (14%).

West et al. (2012)	Tweets from users in nine US states using the word drunk and 20 other synonyms of drunk (e.g. <i>wasted</i> , <i>tipsy</i>). Posted between Oct – Nov 2010 and Dec 2010 – Jan 2011.	Retrieved analytical data for tweets. Used quantitative analysis to compare time and day of the tweet.	Twitter users were most likely to tweet about problem drinking on Friday, Saturday and Sunday during the hours from 10 pm to 2 am. Tweets originating during the New Year's Eve holiday (0.53%) were twice as common when compared to tweets during weekends in the month of October (0.34%).
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