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Effect of Social Media Characteristics on Perceptions of Alcohol-Branded Social Media Content

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Jonathan Keith Noel, Ph.D., M.P.H.

University of Connecticut, 2017

Abstract

Background: Alcohol advertising has recently expanded onto social networking sites (SNSs), which allows users to interact with alcohol ads through user engagement features (e.g. Likes or Shares) and user-generated comments. Few studies have evaluated alcohol advertising on SNSs or investigated how ad interactivity may influence ad perceptions. Two inter-related studies were conducted to answer these questions. *Methods:* In Study 1, alcohol advertising posted on Facebook by Budweiser and Bud Light were evaluated for compliance with a self-regulated alcohol advertising code and for thematic content. User-generated comments written in response to these ads were also evaluated. The results of this study were used to inform Study 2, a 2(within) x 2(between) x 2(between) factorial randomized trial. Participants (n=120) viewed four pre-selected Facebook ads, of which two were compliant and two were non-compliant with a self-regulated alcohol advertising code. Participants also viewed real-world high or low user engagement values and real-world pro- or anti-drinking user-generated comments. Ad appeal, drinking intentions, and individual user engagement were measured after viewing each ad. The results were analyzed using hierarchical linear models. *Results:* In Study 1, 82% of the ads contained 1 or more violations of a self-regulated alcohol advertising code, and 78% of the ads contained one or more content areas previously associated with code violations. Forty-seven percent of the user-generated comments were positive towards the product or drinking. In Study 2, ads non-compliant with a self-regulated alcohol advertising code scored higher on emotional

appeal ($p=0.004$) while compliant ads scored higher on informational ($p<0.001$) and source appeal ($p=0.034$). Pro-drinking user-generated comments significantly increased drinking intentions and individual user engagement. *Discussion:* Self-regulation has failed to prevent potentially harmful content from appearing in Budweiser and Bud Light advertising posted on Facebook. Non-compliance with existing self-regulated alcohol advertising codes was associated with increased emotional appeal, which may result in the ads being remembered more often and recalled more swiftly. Pro-drinking user-generated comments were associated with increased drinking intentions and increased individual user engagement, both of which are associated with increased alcohol consumption. New regulations may be needed to limit alcohol ad content and the influence of user-generated comments.

Effect of Social Media Characteristics on Perceptions of Alcohol-Branded Social Media Content

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A Dissertation

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APPROVAL PAGE

Doctor of Philosophy Dissertation

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TABLE OF CONTENTS

ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS.....	iv
LIST OF TABLES	ix
LIST OF FIGURES	xiii
INTRODUCTION	1
Alcohol Consumption	1
<i>Prevalence of Alcohol Consumption</i>	1
<i>Public Health Impact</i>	2
Alcohol Advertising	3
<i>Prevalence</i>	3
<i>Risk Factor for Alcohol Consumption</i>	4
Restrictions on Alcohol Advertising	8
<i>Effectiveness of Self-Regulation</i>	11
Response to Alcohol Imagery	14
<i>Alcohol-Related Cues</i>	14
<i>Alcohol Advertising</i>	20
Social Media.....	21
<i>Definition</i>	21
<i>Extent of Use</i>	22
<i>Interacting with Social Media</i>	22
<i>Relationship with Alcohol Use</i>	23

Alcohol Advertising on Social Media	25
<i>Content of Alcohol Advertising on Social Media</i>	26
<i>Awareness of Alcohol Advertising on Social Media</i>	27
<i>Influence on Alcohol Consumption</i>	28
Perceptions of Advertising on Social Media	28
<i>Attitudes toward Social Media Advertising</i>	28
<i>Factors that Influence Attitudes</i>	29
<i>The Role of User Engagement</i>	31
<i>The Role of User-Generated Content</i>	32
Summary	33
Hypotheses	34
Significance	34
METHODS	36
Study 1 – A Systematic Evaluation of Alcohol Advertising on Facebook	36
SNS Selection	36
Advertisement Selection	36
Code Violation Ratings	37
Ad Content Analysis	40
User-Generated Comments Content Analysis	40
Statistical Analysis	41
Study 2 – Effect of Social Media Characteristics on Perceptions of Alcohol Advertising on Facebook	43
Theoretical Background	43

Study Design.....	44
Participants	44
Advertisement Selection.....	46
User Engagement Selection.....	48
User-Generated Comment Selection	49
Dependent Measures.....	50
Covariates	52
Study Procedure.....	53
Statistical Analysis	54
RESULTS	61
Study 1 – A Systematic Evaluation of Alcohol Advertising on Facebook	61
Ad Characteristics.....	61
Identification of Code Violations	62
Identifying Thematic Content in the Selected Facebook Ads	64
Identifying Thematic Content in User-Generated Comments	67
Summary of Study 1 Findings	68
Study 2 – Effect of Social Media Characteristics on Perceptions of Alcohol Advertising on Facebook	68
Participant Characteristics	68
Total Ad Appeal	69
Source Appeal.....	73
Informational Appeal.....	76
Emotional Appeal	79

Drinking Intentions.....	82
Individual User Engagement	86
Experimental Credibility	89
Summary of Study 2 Results	89
DISCUSSION.....	90
Ineffectiveness of Self-Regulation	91
Emotion in Advertising	93
Increased Drinking Intentions and Alcohol Consumption.....	97
Message Diffusion on SNSs.....	98
User-Generated Comments as Word of Mouth.....	99
The Role of Weak Social Ties.....	103
Secondary Findings	105
Implications.....	107
Strengths and Limitations.....	111
Future Research Directions	116
CONCLUSIONS.....	117
REFERENCES	119
APPENDICES	173
Appendix 1 – Ad Rating Questions Mapped onto IARD’s Guiding Principles.....	173
Appendix 2 – Individual Scoring Criterion.....	176
Appendix 3 – Facebook Ads Used in Study 2	179
Appendix 4 – Study 2 Questionnaire	195
Appendix 5 – Thematic Content Areas Identified in the Selected Facebook Ads	202

Appendix 6– Thematic Content Areas in User-Generated Comments	203
Appendix 7 – Supplementary Tables for the Methods Section.....	206
Appendix 8 – Supplementary Tables for the Results	207

LIST OF TABLES

Table 1. Study 2 research design shown the between-subjects and within-subjects factors	44
Table 2. Order of Facebook ads viewed by each experimental group in Study 2	53
Table 3. The prevalence of violations of IARD's Guiding Principles in 50 selected Facebook ads, as evaluated by 11 members of the Delphi rating panel, % (n)	63
Table 4. The prevalence of thematic content in the 50 selected Facebook ads, % (n)	65
Table 5. Prevalence of thematic content areas in user-generated comments, % (n).....	66
Table 6. Hierarchical linear modeling results for the effects of ad content, user engagement, and user-generated comments on total ad appeal, with adjustment for covariates, model set 1, the unconditional model and models 1 through 3.....	71
Table 7. Hierarchical linear modeling results for the effects of ad content, user engagement, and user-generated comments on total ad appeal, with adjustment for covariates, model set 1 continued, models 4 through 6.....	72
Table 8. Hierarchical linear modeling results for the effects of ad content, user engagement, and user-generated comments on source appeal, with adjustment for covariates, model set 2, the unconditional model and models 1 through 3.....	74
Table 9. Hierarchical linear modeling results for the effects of ad content, user engagement, and user-generated comments on source appeal, with adjustment for covariates, model set 2 continued, models 4 through 6.....	75
Table 10. Hierarchical linear modeling results for the effects of ad content, user engagement, and user-generated comments on informational appeal, with adjustment for covariates, model set 3, the unconditional model and models 1 through 3	77

Table 11. Hierarchical linear modeling results for the effects of ad content, user engagement, and user-generated comments on informational appeal, with adjustment for covariates, model set 3 continued, models 4 through 6.....	78
Table 12. Hierarchical linear modeling results for the effects of ad content, user engagement, and user-generated comments on emotional appeal, with adjustment for covariates, model set 4, the unconditional model and models 1 through 3.....	80
Table 13. Hierarchical linear modeling results for the effects of ad content, user engagement, and user-generated comments on emotional appeal, with adjustment for covariates, model set 4 continued, models 4 through 6.....	81
Table 14. Hierarchical linear modeling results for the effects of ad content, user engagement, and user-generated comments on drinking intentions, with adjustment for covariates, model set 5, the unconditional model and models 1 through 3.....	84
Table 15. Hierarchical linear modeling results for the effects of ad content, user engagement, and user-generated comments on drinking intentions, with adjustment for covariates, model set 5 continued, models 4 through 6.....	85
Table 16. Hierarchical linear modeling results for the effects of ad content, user engagement, and user-generated comments on individual user engagement, with adjustment for covariates, model set 6, the unconditional model and models 1 through 3	87
Table 17. Hierarchical linear modeling results for the effects of ad content, user engagement, and user-generated comments on individual user engagement, with adjustment for covariates, model set 6 continued, models 4 through 6	88
Table S18. Expected mean for ad appeal, between-subjects effects.....	206
Table S19. Expected means for ad appeal, within-subjects effect.....	206

Table S20. User engagement by brand for all Facebook ads published during the study period (n = 91)	207
Table S21. User engagement by brand for ads randomly selected for further evaluation (n = 50)	207
Table S22. Intra-class correlations for items used to determine violations of IARD's Guiding Principles.....	208
Table S23. Guideline and sub-guideline violations per ad by criterion.....	209
Table S24. Item level inter-rater reliability of identifying thematic content areas in selected Facebook ads.....	210
Table S25. Inter-rater reliability for thematic content areas in user-generated comments	211
Table S26. Participant demographic and behavioral characteristics, continuous and ordinal variables	212
Table S27. Participant demographic and behavioral characteristics, nominal variables only	212
Table S28. Collapsed participant demographic and behavioral characteristics, nominal variables only	213
Table S29. Participant demographic and behavioral characteristics across user engagement groups, continuous and ordinal variables.....	214
Table S30. Participant demographic and behavioral characteristics across user engagement groups, nominal variables only	214
Table S31. Participant demographic and behavioral characteristics across user-generated comments groups, continuous and ordinal variables	214
Table S32. Participant demographic and behavioral characteristics across user-generated comments groups, nominal variables only.....	215

Table S33. Participant demographic and behavioral characteristics across all groups, continuous and ordinal variables	215
Table S34. Participant demographic and behavioral characteristics across all groups, nominal variables only	216

LIST OF FIGURES

Figure 1. Facebook ads selected for Study 2.	47
Figure 2. Hypothetical determination of a violation of a self-regulated alcohol advertising code.	178
Figure 3. Compliant Budweiser ad with high user engagement and pro-drinking comments....	179
Figure 4. Non-compliant Budweiser ad with high user engagement and pro-drinking comments.	180
Figure 5. Compliant Bud Light ad with high user engagement and pro-drinking comments. ...	181
Figure 6. Non-compliant Bud Light ad with high user engagement and pro-drinking comments.	182
Figure 7. Compliant Budweiser ad with high user engagement and anti-drinking comments. ..	183
Figure 8. Non-compliant Budweiser ad with high user engagement and anti-drinking comments.	184
Figure 9. Compliant Bud Light ad with high user engagement and anti-drinking comments....	185
Figure 10. Non-compliant Bud Light ad with high user engagement and anti-drinking comments.	186
Figure 11. Compliant Budweiser ad with low user engagement and pro-drinking comments...	187
Figure 12. Non-compliant Budweiser ad with low user engagement and pro-drinking comments.	188
Figure 13. Compliant Bud Light ad with low user engagement and pro-drinking comments....	189
Figure 14. Non-compliant Bud Light ad with low user engagement and pro-drinking comments.	190
Figure 15. Compliant Budweiser ad with low user engagement and anti-drinking comments. .	191

Figure 16. Non-compliant Budweiser ad with low user engagement and anti-drinking comments.	
.....	192
Figure 17. Compliant Bud Light ad with low user engagement and anti-drinking comments. ..	193
Figure 18. Non-compliant Bud Light ad with low user-engagement and anti-drinking comments.	
.....	194

INTRODUCTION

Alcohol use remains a major modifiable risk factor for non-communicable disease (Lim et al. 2012), and alcohol advertising has emerged as a critical issue surrounding alcohol use by underage youth because of advertising's effects on the early onset of drinking and binge drinking. For example, three systematic reviews have concluded that exposure to alcohol advertising increases the risk of early alcohol initiation, binge drinking initiation, and overall alcohol consumption in youth (Jernigan et al. 2017; Anderson et al. 2009; Smith and Foxcroft 2009). Although existing research on alcohol advertising has been informative, it has not kept pace with the rapid rise in the use of non-traditional media outlets for advertising purposes. This dissertation describes a research project that systematically evaluates the content of alcohol advertising, particularly in reference to the alcohol industry's self-regulated alcohol advertising codes, published on a non-traditional media platform (i.e., social media), and then determines if characteristics specific to this platform influence how alcohol advertising messages are perceived. In the remainder of the Introduction, I will orient the reader to the public health impact of alcohol consumption, the extent and effects of alcohol advertising imagery, and existing policies and trends to restrict alcohol advertising. The extent and perceptions of social media advertising is then discussed.

Alcohol Consumption

Prevalence of Alcohol Consumption

Worldwide, alcohol consumption is widespread. Approximately 38% of the 15+ population are current drinkers, and 16.0% of drinkers are current binge drinkers (Fleischmann et al. 2014). In the United States (U.S.), 53.1% of the adult population were current drinkers in 2014, and 16.0% of the overall population were classified as current binge drinkers (Centers for Disease Control and Prevention 2015). In 2015, 32.8% of U.S. high school students were classified as current

drinkers, and 17.7% were classified as current binge drinkers (Centers for Disease Control and Prevention 2015), although there were inter-state disparities. Rates of current drinking ranged from 22.0% in Alaska to 34.8% in Arizona (Centers for Disease Control and Prevention 2015).

Public Health Impact

Alcohol consumption is related to over 200 disease and injury states (Fleischmann et al. 2014). Short term health risks include motor vehicle crashes (Smith, Branas, and Miller 1999), intimate partner violence (Mohler-Kuo et al. 2004), poisoning (Abbey 2002), engagement in risky sexual behaviors that can lead to the transmission of sexually transmitted diseases (Wechsler et al. 1994), and spontaneous abortion (Kesmodel et al. 2002). Long-term risks of alcohol consumption include cardiovascular disease (Corrao et al. 2004), cancer (Baan et al. 2007), mental health problems (Castaneda et al. 1996), social problems (Booth and Feng 2002; Leonard and Rothbard 1999), and alcohol dependence (Dawson and Archer 1993). Youth alcohol consumers are particularly prone to negative alcohol consequences, including increased school absences, fighting, arrests, illnesses, unwanted sexual activity, unintentional injuries, and memory problems (U.S. Department of Health and Human Services 2007; Miller et al. 2007).

In the U.S., excessive alcohol use leads to approximately 2.5 million years of potential life lost (Stahre et al. 2014), and 88,000 deaths, including 4,300 deaths among youth under the minimum legal alcohol purchase age (MLPA), annually (Centers for Disease Control and Prevention n.d.). In 2011, 215.8 emergency department visits per 100,000 youth were attributable to alcohol use, excluding poly-substance users, compared to 134.6 visits per 100,000 for the remainder of the population (Drug Abuse Warning Network 2013), and in 2010, alcohol consumption was responsible for \$249 billion in economic costs in the U.S. (Sacks et al. 2015).

Alcohol Advertising

As described below, alcohol advertising is highly prevalent. Moreover, alcohol ads often appear near youth-oriented locations, and youth are often exposed to alcohol advertising at rates similar to or exceeding adult populations. This high rate of exposure can lead to significant increases in alcohol initiation and alcohol consumption among youth.

Prevalence

Between 2001 and 2009, there were over 2.6 million alcohol ads broadcast on U.S. television (CAMY 2012). There were nearly 800,000 alcohol ads broadcast on radio in the 75 largest U.S. markets in 2009 alone (CAMY 2011), and between 2001 and 2008, 29,000 alcohol ads were published in U.S. magazines (CAMY 2010). High rates of outdoor alcohol advertising have also been reported. In the neighborhood of Central Harlem in New York City, there was at least one alcohol ad within 152 meters of 79.4%, 83.3% and 59.1% of neighborhood schools, churches, and playgrounds, respectively, in 2005 (Kwate and Meyer 2009), and between 2003 and 2005, 1,701 storefront ads for alcohol were detected in 450 U.S. census tracts within 20 U.S. cities (McKee et al. 2011).

Sixth grade students have reported viewing 5 television beer ads, 1.7 magazine alcohol ads, 1.9 radio alcohol ads, and 4.5 in-store beer displays per week (Collins et al. 2007), and 588 middle school students were exposed to 23,446 alcohol ads over a 2 week monitoring period, or approximately 3 ads per student per day (Martino et al. 2016). Similar results have been reported in Australia (Fielder, Donovan, and Ouschan 2009), Brazil (Pinsky et al. 2010), and Scotland (Gordon, MacKintosh, and Moodie 2010).

Risk Factor for Alcohol Consumption

Multiple research studies have indicated that alcohol advertising is likely a causal risk factor for earlier alcohol initiation, increased alcohol consumption, and increased alcohol-related problems (Anderson et al. 2009; Smith and Foxcroft 2009; Jernigan et al. 2017). Econometric analysis indicates that the effect of alcohol advertising on consumption exists even after controlling for price fluctuations (Sabuhoro, Larue, and Larivière 1997), and each additional alcohol advertisement seen by youth can increase the number of drinks consumed in the past month by 1% (Snyder et al. 2006). Moreover, each additional dollar spent per capita on alcohol advertising can increase the number of drinks consumed per capita by 3% (Snyder et al. 2006). For three of the most popular liquor brands, increased electronic advertising between 1971 and 2008 was significantly associated with increased brand-specific consumption (Wilcox, Kim, and Schultz 2012), and underage youth were 500% and 36% more likely to consume alcohol brands that advertised on national television and in national magazines, respectively (Siegel et al. 2016). Furthermore, alcohol brands that advertised during 20 television shows popular among 12 to 20 year olds were consumed more often by a sample of U.S. adolescents compared to brands that did not advertise during those shows (Ross et al. 2015).

In addition to these exposure studies, survey research has produced similar findings linking alcohol ad exposure to alcohol consumption. Significant, positive associations between exposure to alcohol advertising and drinking behavior or intentions to drink were observed in a cross-sectional study of Scottish secondary school students (Gordon et al. 2011), and an additional survey of Scottish teens indicated that exposure to alcohol advertising in films was positively associated with past week heavy drinking and binge drinking (Hunt et al. 2011). Young Australian adults indicated that alcohol point-of-sale advertising strongly influenced their decision to buy

more alcohol or a different brand of alcohol than originally intended (Jones and Smith 2011), and in a convenience sample of 220 adults in Kumasi, Ghana, exposure to alcohol advertising was significantly associated with increased alcohol consumption (Amoateng and Poku 2013).

Importantly, these findings have been replicated in multiple longitudinal studies. For example, a one standard deviation increase in watching television programs that contain alcohol ads in seventh grade was associated with a 44% increase risk in beer use, a 34% increase risk in wine or liquor use, and a 26% increased risk in three-drink episodes in eighth grade (Stacy et al. 2004). Exposure to alcohol advertising or liking alcohol ads in seventh grade was predictive of past 30 day and past 6-month alcohol use in 10th grade, including binge drinking, drinking enough to get drunk, and alcohol-related problems, such as neglecting responsibilities and getting into fights (Grenard, Dent, and Stacy 2013). In a sample of U.S. youth, 13 to 20 years old, any exposure to brand-specific advertising was associated with a significant increase in brand-specific alcohol consumption (Ross et al. 2014). Similar results have been found in Germany, where exposure to alcohol advertising at baseline among sixth to eighth grade students predicted alcohol initiation at a nine month follow-up (Morgenstern et al. 2011).

In a longitudinal study of New Zealand teenagers, there was a consistent positive relationship between the recall of alcohol advertisements at 15 years old and beer drinking at 18 years old in males (Connolly et al. 1994), and exposure to alcohol advertising was positively associated with alcohol consumption in a sample of New Zealand young adults, even though aggregate alcohol consumption in the population was simultaneously declining (Casswell and Zhang 1998). In a study of 12 to 17 year old Australian adolescents, exposure to alcohol advertising in magazines and bottle shops, along with promotional materials, was associated with early alcohol initiation, and exposure to magazine and internet alcohol ads were associated with drinking in the past 4

weeks (Jones and Magee 2011). Involvement and awareness of alcohol advertising at baseline was associated with alcohol initiation and increased drinking frequency at a 2-year follow-up in a cohort of Scottish 12 to 14 year olds (Gordon, MacKintosh, and Moodie 2010). Furthermore, a re-analysis of Strickland's (1983) survey data of seventh, ninth, and eleventh grade students in the U.S. revealed that exposure to alcohol advertising affects alcohol consumption through direct and indirect pathways (Adlaf and Kohn 1989). Additionally, adolescents exposed to alcohol ads containing a "party" theme were 19.2 times more likely to initiate drinking and 3.9 times more likely to initiate binge drinking (Morgenstern et al. 2016).

Ownership of alcohol-branded merchandise may have a particularly strong effect on alcohol use, and alcohol use may stimulate ownership of branded merchandise. Approximately 84% of established drinkers in a sample of U.S. middle and high school students owned alcohol-branded clothing, and those who received alcohol-branded clothing from a parent were more likely to perceive that their parents approved of their drinking (Workman 2003). Among 2,400 middle school students who were never drinkers at baseline, ownership of alcohol-branded merchandise predicted alcohol initiation (McClure et al. 2006), and in a separate sample of adolescents, ownership of alcohol branded merchandise and susceptibility to alcohol advertising significantly predicted alcohol initiation and binge drinking over an 8 month period in never drinkers (McClure et al. 2009). Findings from the Growing Up Study also indicated that possession of or willingness to use alcohol promotional items was predictive of alcohol initiation (Fisher et al. 2007).

Receptivity to alcohol advertising, typically measured using either ad appeal or ad recall, is an important mediator between exposure to alcohol advertising and alcohol use. For instance, ads for alcohol brands most consumed by youth are considered more appealing than ads for brands that are unpopular with youth (Siegel et al. 2016), and Brazilian teens who reported drinking in the

previous month perceived alcohol ads to be more appealing compared to teens who did not drink in the previous month (Vendrame et al. 2009). Being able to name a favorite brand to drink mediated the relationship between alcohol brand exposure in movies and binge drinking in a cross-sectional analysis of 1,700 U.S. underage drinkers (McClure et al. 2013), and awareness of alcohol advertising through each of 15 advertising channels increased the odds of being a drinker by 8% in a sample of New Zealand 13 and 14 year olds (Lin et al. 2012). In a longitudinal study, sixth through eighth grade U.S. students who were never drinkers and more receptive to alcohol advertising at baseline were 77% more likely to initiate drinking at a 12-month follow-up compared to those who were not receptive (Henriksen et al. 2008). Moreover, alcohol advertising receptivity can predict the onset of drinking, the onset of binge drinking, and the onset of hazardous drinking in U.S. adolescents under the MLPA (Tanksi et al. 2015). In a sample of European adolescents, alcohol advertising receptivity was predictive of binge drinking at a 12-month follow-up (Morgenstern et al. 2014), and receptivity to internet alcohol advertising was positively associated with future problem drinking in a sample of U.S. youths (McClure et al. 2016).

Alcohol advertising may influence cognitive perceptions of alcohol. In a sample of 15 to 20 year olds, the relationship between alcohol advertising and intentions to drink was mediated by an increase in positive expectancies and other cognitive responses (Fleming, Thorson, and Atkin 2004). Interestingly, this relationship was non-significant in a sample of young adults, 21 to 29 years old. Positive responses to beer advertisements have been associated with increases in the amount of alcohol consumed on drinking occasions, which subsequently predicted the experience of alcohol-related problems (Wyllie, Zhang, and Casswell 1998), and exposure to branded alcohol billboards was positively associated with positive attitudes towards drinking among a sample of Mexican American high school students (Mastro and Atkin 2002). Regarding intentions to

consume alcohol, alcohol advertising may play a more important role than parents or peers by significantly altering alcohol expectancies (Sancho, Miguel, and Aldás 2011).

These findings have been difficult to replicate under experimental conditions and over shorter periods (Koordeman, Anschutz, and Engels 2012), although one study did demonstrate that alcohol consumption increased in weekly drinkers after watching movies that contained alcohol advertisements (Koordeman, Anschutz, and Engels 2011).

Overall, there are approximately 20 prospective cohort studies, and several cross-sectional studies, that have concluded that exposure to alcohol advertising is a risk factor for earlier alcohol initiation, increased alcohol consumption, and/or increased intention to drink. However, the observational nature of these studies leaves open the possibility that the observed relationships may be due to an unmeasured confounder rather than a causal link between ad exposure and use. Nonetheless, consistent findings linking exposure to alcohol advertising and alcohol consumption have been reported in multiple studies across multiple countries. These studies have used a variety of methods to estimate ad exposure and ad receptivity, and advertising published on a wide-range of media platforms has been studied. Moreover, studies on receptivity and expectancy suggest that there is a plausible psychological mechanism for how alcohol marketing influences alcohol consumption. Importantly, no study has concluded that exposure to alcohol advertising was associated with a significant decrease in alcohol consumption.

Restrictions on Alcohol Advertising

In efforts to reduce alcohol consumption, some countries have passed legislative restrictions on alcohol advertising (Babor et al. 2010). As of 2012, 10.1% of countries worldwide had imposed total bans on alcohol advertising across ten unique advertising channels (i.e., national television, cable television, national radio, local radio, print, billboards, point of sale, cinema, internet, and

social media) (Fleischmann et al. 2014). Approximately 40% of countries had no alcohol advertising restrictions. The remaining countries either have implemented partial bans on the time, place, and/or content of alcohol advertising, or relied on voluntary self-regulation.

There are several examples of partial legislative restrictions on alcohol advertising. Spirits advertising, but not beer or wine advertising, has been banned in Austria, Belgium, Finland, Germany, and Ireland (Institute of Alcohol Studies 2013), and Finland has prohibited all Finnish alcohol producers from advertising on social networking sites (SNSs) (YLE 2014). France's Loi Évin prohibits alcohol advertising for any product that has an alcohol content of greater than 2% by volume and restricts advertising for these products to only the name of the alcohol producer, the brand name of the product, and product characteristics (Parlement français 1991). Alcohol ads may not directly or indirectly promote alcohol consumption, imply that drinking alcohol is beneficial, or show the product or its packaging according to Thailand's Alcoholic Beverage Control Act (National Assembly of Thailand 2008), and two Mexican laws, the Mexican General Law of Health and the Federal Radio and Television Law, restrict the content of alcohol advertising and when alcohol ads can be broadcast (Hurtado 2013). The Advertising Act of Ukraine requires alcohol ads to be broadcast only from 11:00pm to 6:00am (Verkhovna Rada 1996).

In the absence of legislative restrictions and, in some cases, in addition to them, the alcohol industry has created self-regulated systems to restrict alcohol advertising. Self-regulation is defined as a system where regulations are promulgated by an industry, the industry enforces the regulations, and the industry adjudicates potential violations of the regulations (Campbell 1999). Self-regulated alcohol advertising codes take several forms. In some countries, national advertising or media associations have created these codes. This includes Australia, where the Alcohol Beverages Advertising Code regulates ad content and the Outdoor Media Association of

Australia and Free TV Australia govern ad placement (ABAC 2014; Outdoor Media Association 2014; FreeTV Australia 2013), and Brazil, where alcohol advertising is regulated by the National Council for Self-Regulation in Advertising (Conselho de Auto-Regulamentação Publicitária 2014). Other self-regulated alcohol advertising codes have been created by corporate social responsibility organizations that are funded by the alcohol industry. This has occurred in the United Kingdom (U.K.), where the Portman Group has created a code that applies to all alcoholic beverages (Portman Group 2012), and in the U.S., where producers of primarily beer, wine, and distilled spirits follow similar but distinct codes that are developed, implemented, and enforced by trades associations such as the U.S. Beer Institute, the Wine Institute, and the Distilled Spirits Council of the U.S. (U.S. Beer Institute 2015; Wine Institute 2011; Distilled Spirits Council of the United States, Inc. 2011). The International Alliance for Responsible Drinking (IARD), an international organization sponsored solely by the alcohol industry, has also published a self-regulated advertising code. Called the Guiding Principles: Self-Regulation of Marketing Communications for Beverage Alcohol (Guiding Principles), the code is intended to apply to all advertising for all alcoholic beverages in countries where self-regulation predominates (International Alliance for Responsible Drinking 2011). Moreover, in addition to endorsing the Guiding Principles, large alcohol producers, including Anheuser-Busch InBev (A-B InBev) (A-B InBev 2016), SABMiller (SABMiller 2014), Diageo (Diageo 2015), and Heineken (Heineken 2008), have created internal advertising codes.

The regulations within self-regulated alcohol advertising codes can be separated into exposure guidelines and content guidelines. Typically, exposure guidelines specify that alcohol advertising should not be broadcast or displayed where the percent of underage individuals exceeds 30% (International Alliance for Responsible Drinking 2011). Content guidelines are classified along

five major themes as outlined by IARD's Guiding Principles: responsible marketing communications, responsible alcohol consumption, health and safety aspects, protection of minors, and the effects of alcohol. Example guidelines include *“Alcohol beverage marketing communications should...avoid showing minors (or people likely to be perceived as minors) drinking alcohol beverages”* and *“Alcohol beverage marketing communications should not...present alcohol beverages as necessary for social success or acceptance.”*

Recently, alcohol companies and industry-sponsored organizations have produced digital advertising codes that are specific to websites, SNSs, and smartphone applications. Major alcohol producers, including A-B InBev, Bacardi Limited, Beam, the Brewers Association of Japan, Brown-Forman, Carlsberg, and Diageo, sponsored the creation of the Digital Guiding Principles. The Digital Guiding Principles recommend that digital platforms for alcoholic beverages utilize an age affirmation mechanism, provide a warning not to forward content to individuals under the legal purchase age, include a responsible drinking message, respect user privacy, and follow the recommendations regarding placement and ad content contained within the original Guiding Principles (International Alliance for Responsible Drinking 2014). Diageo has also created a company specific digital code that largely mirrors the Digital Guiding Principles, with the notable addition of requiring consent in order for the company to send direct communications to an individual via email (Diageo 2014).

Effectiveness of Self-Regulation

Multiple studies have directly assessed the ability of self-regulated alcohol advertising codes to restrict the content of alcohol advertising and limit youth exposure in traditional media. These studies demonstrate that the codes, as currently constructed, are ineffective (Noel, Babor, and Robaina 2017).

Seventeen studies have been conducted on the effectiveness of alcohol advertising self-regulation to restrict the content of alcohol advertising. None concluded self-regulation was effective. The studies can be divided into two broad categories. Some studies used pre-selected ads that were thought to contain code violations. Other studies used either a random sample of ads or implemented a total survey approach, collecting all advertisements published within a given time window. Among studies that used pre-selected ads, conducted in Australia, Brazil, and the U.S., the violation rate was 100% (Saunders and Yap 1991; Jones and Donovan 2002; Babor, Xuan, and Proctor 2008; Vendrame et al. 2010; Vendrame et al. 2015).

Among studies that used a random sample or total survey approach, the code violation rate varied by medium. For studies on magazine ads, conducted in Australia, Ukraine, and the U.S., the code violation rate ranged from 0% to 52% (Jones, Hall, and Munro 2008; Donovan et al. 2007; Rhoades and Jernigan 2013; Wolburg and Venger 2009; Smith, Cukier, and Jernigan 2014). The study reporting a 0% violation rate noted that the spirit of the guidelines appeared to be violated even if the specific wording was not (Wolburg and Venger 2009). For studies on television ads, conducted in Argentina, Australia, Brazil, Canada, Mexico, Spain, the U.K., and the U.S., code violation rates between 12% and 86% were reported (Jones, Hall, and Munro 2008; Jones, Phillipson, and Barrie 2010; Babor et al. 2013; Zwarun and Farrar 2005; Noel et al. 2017; Searle, Alston, and French 2014). One study used advertising campaigns as the unit of analysis and reported a 100% violation rate (Farrell and Gordon 2012). One additional study compared digital alcohol advertising to a self-regulated advertising code, and the reported code violation rate was 74% (Gordon 2011).

Similar types of code violations occurred across studies. Ads in Australia, Brazil, India, Malawi, Nigeria, Philippines, Sri Lanka, Thailand, and the U.S. violated guidelines intended to

protect youth under the legal purchase age (Donovan et al. 2007; Babor et al. 2013; Vendrame et al. 2010; Farrell and Gordon 2012). Ads in Argentina, Australia, Brazil, Canada, Ukraine, the U.K., and the U.S. violated guidelines prohibiting the association of alcohol with social or sexual success (Saunders and Yap 1991; Jones and Donovan 2002; Donovan et al. 2007; Jones, Phillipson, and Barrie 2010; Babor et al. 2013; Noel et al. 2017; Rhoades and Jernigan 2013). Furthermore, ads in Argentina, Brazil, Canada, the U.K., and the U.S. violated guidelines prohibiting the association between alcohol and health benefits (Noel et al. 2017; Searle, Alston, and French 2014).

Violations of the exposure guidelines of the self-regulation codes are also common. In 2010, 23.7% of alcohol ads broadcast on television in 15 of the largest U.S. markets violated these guidelines (Jernigan et al. 2013), and from 2005 to 2012, youth under the legal purchase age were exposed to 15.2 billion non-compliant impressions, where an impression was defined as the number of times an individual or group has seen an ad (Ross, Brewer, and Jernigan 2016). In 2004, there were approximately 9,500 non-compliant radio ads broadcast in the 108 largest U.S. markets (Jernigan et al. 2006). By 2009, there were approximately 73,500 non-compliant radio ads broadcast in the 75 largest U.S. markets (CAMY 2011). Compliance for magazine alcohol ads has increased over time; however, as compliance rates have increased, youth exposure has also increased on a per capita basis (CAMY 2010). Violations of the exposure guidelines do not imply that young persons or other vulnerable groups were exposed to potentially harmful content; however, as noted above, the high prevalence of code violations of the content guidelines suggests that the chance of exposure to a non-compliant ad is high.

Self-regulation, whereby the alcohol or advertising industry creates and enforces an advertising code is a common model of alcohol advertising regulation. Evidence strongly suggests that this

system has been ineffective at restricting the content used in alcohol advertising, particularly content that may be appealing to youth, and at limiting youth exposure to alcohol advertising.

Response to Alcohol Imagery

Although several studies have observed a link between exposure to alcohol advertising and alcohol consumption, few describe a mechanism of action for how alcohol advertising can increase consumption. Findings from the psychological literature suggest that a plausible mechanism of action may exist and that the pathway may be strongest in current drinkers.

Alcohol-Related Cues

Cue reactivity, derived from the Pavlovian conditioning paradigm, is a learned response whereby environmental cues invoke physiological or psychological reactions (Tiffany 1995). Substantial research demonstrates that alcohol-related cues (e.g. a glass of beer) elicit multiple responses important to future alcohol use and the addiction process.

Psychological Reactions

Alcohol cues can elicit strong psychological reactions. Among social drinkers, alcohol cue reactivity has been significantly associated with total scores on the Desire for Alcohol Questionnaire (DAQ) (Schulze and Jones 2000), with strong positive associations occurring primarily with the strong desires and intentions and the mild intentions to drink DAQ sub-scales (Schulze and Jones 1999). Craving for alcohol can become elevated in heavy and light drinkers after exposure to alcohol cues (Papachristou et al. 2012), and this effect is particularly pronounced when viewing preferred alcoholic beverages (Staiger and White 1991). Progressively decreasing effects were observed when more different products were viewed. Exposure to alcohol-related cues has been associated with an increase in craving and arousal in a sample of abstinent alcoholics (Krienne et al. 2014) and in a sample of alcohol-dependent patients in a detoxification program

(Witteman et al. 2015). Reactivity to alcohol-related cues has also been demonstrated in moderate and light drinkers (Papachristou et al. 2012). Consumptive alcohol cues can elicit increases in appetitive motivation in social drinkers (Kambouropoulos and Staiger 2004), and the effect is strongest when the stimuli are more rewarding than expected (Ivory, Kambouropoulos, and Staiger 2014).

Physiological Reactions

Alcohol cues can induce changes in heart rate and can activate numerous regions of the brain. For example, heart rate variability was significantly higher among alcoholics than social drinkers after exposure to an alcohol cue (Rajan et al. 1998), and high craving alcoholics have shown immediate heart deceleration after exposure to alcohol pictures (Ingjaldsson, Thayer, and Laberg 2003). Moreover, alcohol-related pictures induced activation in areas of the brain associated with visual emotional processing, reward, and attention in a pilot fMRI study of abstinent alcoholics (Wrase et al. 2002). These pictures also activated areas of the brain involved in processing memory, self-control, and self-reflection (Krienke et al. 2014). Heavy but non-dependent alcohol drinkers had increased alcohol cue responses in the emotional and reward regions of the brain but decreased responses to cues of higher order life goals, which suggests these individuals may be unable to find activities other than drinking that they deem socially acceptable (Ihssen et al. 2011).

Other studies have demonstrated that alcohol cues can elicit neural activity in areas of the brain involved in memory, visual processing, language processing, emotion, and decision making (Courtney and Ray 2014; Holla et al. 2014; Courtney, Ghahremani, and Ray 2015). Neural activity in the precuneus, posterior cingulate gyrus, and lingual gyrus regions of the brain can be predicted by alcohol craving and reinforcement (Courtney and Ray 2014), and greater neural activation was observed in the right insular cortex after exposure to alcohol-related visual cues compared to

neutral cues (Holla et al. 2014). In a sample of alcohol dependent adults, alcohol cues elicited greater responses in the hippocampus, amygdala, inferior frontal gyrus, temporal cortex, and occipital cortex prior to priming with alcohol (Courtney, Ghahremani, and Ray 2015). In a small sample of non-treatment seeking alcoholics, alcohol cue activation of the striatum, which is involved in reward learning, was stable and considered reliable over time (Schacht et al. 2011). Compared to healthy and depressed/anxious but not alcohol dependent controls, alcohol dependent patients had greater alcohol cue reactivity in brain pathways associated with motivation, and duration of alcohol dependence was positively associated with greater activation in the brain structure involved in habits (Sjoerds et al. 2014).

Effect of Prior Heavy Alcohol Use

Individuals with a history of heavy alcohol use may be particularly vulnerable to alcohol cues. High craving alcoholics have shown immediate heart deceleration after exposure to alcohol pictures and a significant increase in difficulty resisting a drink, indicating pre-attentive processing and autonomic attentional focusing of alcohol information (Ingjaldsson, Thayer, and Laberg 2003; Ingjaldsson, Thayer, and Laberg 2003). Some research has indicated that binge drinking is associated with higher reactivity to alcohol-related stimuli and lower reactivity to non-alcohol-related stimuli (Petit et al. 2014), and greater cue reactivity has been shown to occur in non-dependent binge drinkers, compared to light drinkers, with the effect more pronounced among men (Petit et al. 2013).

Others have shown that heavy drinkers or drinkers with symptoms of alcohol dependence have greater reactions to drinking contexts, such as party atmospheres, than visualization of the drink itself (Lee et al. 2006), and positive affective stimuli associated with drinking occasions can stimulate craving in the absence of direct alcohol cues (Mason et al. 2008). Additionally,

alcoholics may salivate to alcohol cues at a greater rate, and salivate differentially, compared to non-alcoholics, indicating they are conditioned to react to certain non-alcohol stimuli related to alcohol consumption (Monti et al. 1987).

Compared to social drinkers, alcoholics may have difficulty disengaging from alcohol cues due to a deeper, semantic analysis of the cue that results in an inability to shift attention to a non-alcohol stimulus (Storkmark et al. 1997), and heavy drinkers have been shown to have slower reaction times after exposure to alcohol cues compared to heavy drinkers exposed to neutral cues and light drinkers exposed to either alcohol or control cues (Cox, Yeates, and Regan 1999). Among heavy drinking college students, memory of pictures of ordinary objects was suppressed after exposure to an alcohol picture (Kramer and Schmidt 2007). In alcoholic subjects recruited from a treatment program, alcohol cues significantly increased alcohol craving, desire to drink, alcohol-like highs, positive drinking expectancies, and alcohol-like withdrawal symptoms compared to non-alcohol abusing controls (Reid et al. 2006), and subjective craving for alcohol increased in a sample of 40 non-treatment seeking drinkers with alcohol use disorders after exposure to alcohol cues through a virtual reality program (Bordnick et al. 2008). Regardless of social pressures, individuals with alcohol dependence have reported high levels of craving after exposure to alcohol cues in a virtual reality world (Lee et al. 2008).

Those who are alcohol dependent may be more sensitive to alcohol-related cues and less sensitive to cues related to negative alcohol use consequences (Kim et al. 2014). Greater alcohol cue reactivity was associated with greater negative alcohol expectancies in a sample of inpatients with alcohol use disorders while greater subjective arousal was detected in a sample of college students mandated to undergo brief interventions for alcohol use (Eddie et al. 2013). Moreover, problem drinkers with high psychiatric distress displayed greater reactivity to negative affective

alcohol cues compared to problem drinkers with low psychiatric distress (Zack, Toneatto, and MacLeod 1999).

Cue reactivity among alcoholics has been predictive of later alcohol consumption and relapse after treatment (Rohsenow et al. 1994; Litt, Cooney, and Morse 2000; Garland, Franken, and Howard 2012; Papachristou et al. 2014). For example, former patients of an alcohol treatment program that exhibited high cue-elicited alcohol craving had a higher odds of relapse (Papachristou et al. 2014), and in a sample of alcoholics undergoing inpatient treatment, desire to drink after alcohol cue-reactivity sessions explained 8-10% of the variance in alcohol consumption after discharge (Litt, Cooney, and Morse 2000).

Adolescents and Young Adults

Because brain development is incomplete among adolescent and young adult drinkers, reactivity to alcohol-related cues may warrant additional concerns. Indeed, cue reactivity was positively associated with increases in drinking and alcohol-related problems in a sample of U.S. college students (Dager et al. 2014), and compared to neutral cues, young adult drinkers have shown enhanced memory processing of alcohol cues, with the magnitude equivalent to positive emotional cues (Nguyen-Louie et al. 2016). Craving has been shown to increase in underage college drinkers after exposure to an alcohol-related cue, and greater attentional biases towards later alcohol cues were exhibited after exposure to the initial cue (Ramirez, Monti, and Colwill 2015). Alcohol cues can also elicit greater subjective arousal in college students (Eddie et al. 2013). Importantly, young adult binge drinkers may prioritize the processing of alcohol-related stimuli (Petit et al. 2012). When watching a movie when alcohol is available, young adults were more likely to take a sip of alcohol when an actor was taking a sip, with the effect more pronounced in men (Koordeman et al. 2011).

Alcohol cues hyper-activate similar regions of the brain in adult and adolescent heavy drinkers (Tapert et al. 2004; Dager et al. 2013), and these regions of the brain are related to visual attention, memory, motivation, and habit (Dager et al. 2013). In college students, activation of these regions has been associated with an increase in alcohol craving (Tapert et al. 2004). Heavy drinking adolescents exhibit greater brain activation compared to light or non-drinking adolescents, but these differences can disappear after 1 month of abstinence (Brumback et al. 2015).

Familial history of alcoholism can also influence the response to alcohol cues. Young men at high risk for alcoholism have exhibited increased autonomic and subjective responses to alcohol cues compared to young men at low risk for alcoholism (Walitzer and Sher 1999), and family history of alcoholism was associated with an increased neuronal response in areas of the brain reserved for visual attention, recognition, and encoding (Dager et al. 2013).

Moderators of Cue Reactivity

Several moderators to alcohol cue reactivity have been identified. Response inhibition and trait impulsiveness predicted cue reactivity in a sample of inpatients who were exposed to natural alcohol cues in a bar setting (Papachristou et al. 2013). Stress influences the early stages of processing alcohol-related stimuli and may interfere with the ability to ignore task-irrelevant information (Ceballos et al. 2012). Positive urges to drink after exposure to alcohol cues may be moderated by awareness of previous physiological states associated with alcohol consumption (Rock and Kambouropoulos 2009), and cue reward salience, the idea that a response will only ensue if the stimulus is equal to or more rewarding than anticipated, accounts for significant variance in predicting the urge to drink alcohol (Kambouropoulos and Staiger 2009). Research also suggests a positive association between sensitivity to reward and cue-elicited urge to drink and positive affect (Kambouropoulos and Staiger 2001). Interestingly, alcohol cues may be

associated with lower perceived negative drug consequences (Wright et al. 2013), and alcohol cue reactivity may be moderated by perceived alcohol availability (Papachristou et al. 2012).

Alcohol Advertising

Although limited, research indicates that individuals may respond to alcohol advertising in a manner similar to other alcohol-related cues. In a sample of undergraduate students, print alcohol ads elicited a significant decrease in heart rate among light social drinkers and a significant increase in skin conductance among moderate drinkers (Cassisi et al. 1998). It was concluded that social drinkers may attend to alcohol advertisements irrespective of content and may view the ad as a means to receive new information while moderate social drinkers may display signs of cue reactivity in anticipation of alcohol-related stimuli when such stimuli can be predicted to occur. In a separate sample of undergraduate students, viewing alcohol ads during a sports game significantly increased implicit attitudes towards the brand even after controlling for brand use (Zerhouni et al. 2016).

Various behavioral and individual difference factors may moderate the response to alcohol advertising, and ad interpretations are likely dependent on cognitions individuals develop about themselves and the role of advertising, particularly among youth (Parker 1998). Age, gender, occupation, and alcohol consumption may influence responses to beer, wine, and spirits advertising (Unwin 1992). U.S. college students with alcohol dependence symptoms perceived more drinking among male characters depicted in alcohol ads (Proctor, Babor, and Xuan 2005), and Brazilian teenagers with a history of alcohol consumption viewed alcohol ads more positively than non-drinking teens (Vendrame et al. 2009). Moreover, previous alcohol experiences may result in apathy when confronted with contradictory statements, such as pro-health messaging (Ahn et al. 2011).

Religiosity may also be important. One study found that individuals from different religious backgrounds perceived alcohol ads differently (Weiss and Moore 1990), and less religious seventh and eighth grade students have reported that alcohol advertising is more likely to reflect reality, present situations similar to their lives, and use characters who have traits worth emulating (Thomsen and Rekve 2003).

Alcohol cues elicit numerous psychological and physiological responses, including increased alcohol craving, attentional biases towards alcohol, skin conductance, and activation in areas of the brain related to memory, emotion, and habit formation. This is particularly true among men, and because the brain has not fully developed, youth may be particularly prone to the negative effects of these cues. Alcohol advertising may elicit similar responses.

Social Media

Definition

In the broadest sense, a social networking site (SNS) is any electronic platform that enables its users to create content, share content, and directly network with other users (Merriam-Webster n.d.). The shared content can take many forms. Abstract content includes opinions, ideas, or thoughts (Polander and Shalin 2013). Concrete content includes facts and information. Abstract and concrete content can be created and shared via text, photographs, or videos, based on the technological capabilities of the SNS.

There are over 2 billion monthly users of dozens of unique SNSs worldwide (Statista 2016); however, the most influential SNSs include Facebook (1.6 billion active users) (Statista 2015), Instagram (400 million active users) (Statista 2015), Twitter (305 million active users) (Statista 2015), and YouTube (128 million active users) (Statista 2016).

Extent of Use

In the U.S., SNS use among teens and adults is prevalent. In 2015, 92% of teens, defined as 13 to 17 years old, reported visiting at least one SNS daily, with 24% reporting almost constant SNS use (Lenhart 2015). Only 2% used SNSs less than once per week, and SNS use was higher in African-American and Hispanic populations than Caucasian populations. Facebook was the most popular SNS among teens (71%), but one-third or more of all teens reported using Instagram (52%), Snapchat (41%), Twitter (33%), and Google+ (33%) (Lenhart 2015). Moreover, 71% of teens reported using more than one SNS concurrently. Approximately two-thirds of all adults, defined as 18 years old or older, used at least one SNS in 2015, a nine-fold increase since 2005 (Perrin 2015). Similar to teens, 71% of all adult SNS users maintained a Facebook account, and 52% use two or more SNSs (Duggan et al. 2015). Among adults, there are large discrepancies in SNS use based on age, socioeconomic status, and education. Older adults, adults from lower socioeconomic classes, and adults with a high school degree or less education are less likely to use a SNS compared to younger adults, adults from high socioeconomic classes, or adults with at least some college (Perrin 2015). Nevertheless, a majority of individuals from the lowest education and socioeconomic statuses with internet access continued to maintain at least one SNS account.

Interacting with Social Media

SNSs are distinct from traditional media outlets because platform users can interact with the information presented to them through user engagement options and user-generated comments. Conceptually, “user engagement” has been defined as “a quality of user experiences with technology that is characterized by challenge, aesthetic and sensory appeal, feedback, novelty, interactivity, perceived control and time, awareness, motivation, interest, and affect” (O’Brien and Toms 2008). The definition is operationalized into the number of interactions an individual has

with a SNS post. The exact types of interactions vary based on the SNS used. For example, Facebook users can Like or Share a Facebook post while Twitter users can re-Tweet or Favorite a Twitter post. User-generated comments are discussions, opinions, and observations written in response to SNS content (Lee 2012; Muchnik, Aral, and Taylor 2013).

Relationship with Alcohol Use

The existing literature suggests an association between SNS use and alcohol use behavior. Alcohol-related Facebook activity has been positively associated with scores on the Alcohol Use Disorders Identification Test (AUDIT) (Marczinski et al. 2016), which measures general severity of a drinking problem, and among females living in informal settlements in Cape Town and Elizabeth, South Africa, having a Facebook account was associated with a higher odds of hazardous alcohol consumption (Kaufman et al. 2014). Among a sample of 10th grade students in the U.S., becoming friends with a drinker on a SNS was a risk factor for later alcohol consumption (Huang et al. 2014).

Young adults may regularly use SNSs while drunk or initiate drinking while online (Barnes et al. 2016). For example, SNSs were frequently used by young adult heavy episodic drinkers while drinking during a block party (Whitehill, Pumper, and Moreno 2015). SNS and alcohol use leads to posting alcohol-related images on an individual SNS profile (Stoddard et al. 2012), an act that may independently predict additional alcohol use. In a study of Facebook users, those who published depictions of intoxication or problem drinking on their Facebook accounts had higher AUDIT scores, had a higher odds of being classified as a problem drinker, and were more likely to report a past year alcohol-related injury (Moreno et al. 2012). Posting an alcohol reference on a Facebook profile for the first time was associated with past month alcohol consumption and binge drinking (Moreno et al. 2015), and among incoming college students, alcohol displays on

Facebook profiles prior to enrollment were predictive of binge drinking one year into college (D'Angelo, Kerr, and Moreno 2014). Posting alcohol-related content on Facebook was also an independent predictor of alcohol use in a study of female college students (Miller et al. 2014). An increased frequency of posting alcohol-related content on Facebook was positively associated with increased motives for drinking, including social, enhancement, conformity, and coping motives; drinks consumed per week; alcohol-related problems; alcohol use disorders; and craving (Westgate et al. 2014).

Alcohol-related images are used to construct an online identity. These identities routinely include positive and pleasurable depictions of risky drinking (Hebden et al. 2015), and the recreation of drinking practices has been described by young adults as intensely social and simultaneously pleasurable and problematic (Lyons et al. 2015). Depicting alcohol-related images as part of a social network identity has been predictive of alcohol consumption and negative alcohol-related behaviors, including problem drinking, in college students (Ridout, Campbell, and Ellis 2012). Interestingly, the association between drinking behavior and publishing alcohol-related content on SNSs is stronger among those with a lower drinking identity (Rodriguez et al. 2016).

Viewing alcohol-related content on SNSs is associated with perceptions of alcohol and alcohol consumption. In a randomized controlled trial, higher estimated college drinking norms were estimated by a sample of college students after viewing a fictitious Facebook profile containing depictions of alcohol use (Fournier et al. 2013), and a separate study demonstrated that adolescents who viewed Facebook profiles that contained alcohol use were more willing to use alcohol, with willingness to use alcohol mediated by more favorable attitudes towards, and perceptions of, alcohol use (Litt and Stock 2011). Viewing alcohol-related content posted by SNS friends is

positively associated with alcohol consumption, and the effect is more pronounced among those with fewer friends who drink (Stoddard et al. 2012; Huang et al. 2014). Among adolescents, more frequent exposure to alcohol-related content was associated with greater perceived alcohol consumption among friends and the perception that such use was socially acceptable (Beullens and Vandebosch 2016). Furthermore, viewing friends' alcohol-related content may be predictive of alcohol use disorders (Westgate et al. 2014).

Although SNS-based interventions have been successful at changing health behaviors (Laranjo et al. 2015), only one study has focused on alcohol consumption. Researchers determined that a social norms intervention that provided customized feedback through private messages over Facebook significantly reduced alcohol consumption one month after the intervention (Ridout and Campbell 2014).

SNS use is prevalent among all population segments, and posting or viewing depictions of alcohol use on SNSs has been associated with increased alcohol consumption and alcohol-related problems. It has also been associated with increased positive perceptions and attitudes of alcohol. Depicting alcohol consumption on a SNS may be part of online identity creation, and those with a lower drinking identity may be more susceptible to SNS alcohol depictions.

Alcohol Advertising on Social Media

The large number of users on SNSs has attracted significant attention from corporations and advertisers. Facebook reported \$5.2 billion in ad revenue in the first quarter of 2016 (Peterson 2016), and advertisers spent \$5.6 billion in advertising on YouTube in 2013 (Sterling 2013). Twitter generated \$641 million in ad revenue in the 4th quarter of 2015, a year-over-year increase of 48% (Peterson 2016). Although Instagram only began accepting advertising in 2015, there were

over 200,000 monthly active advertisers on the platform by May 2016 (Meola 2016). In total, the alcohol industry spent more than \$55 million on internet advertising in 2013 (Statistia 2016).

Digital advertising expenditures by alcohol producers have resulted in a proliferation of alcohol-branded accounts on SNSs. In 2012, 1,017 Facebook pages were located for 898 unique alcohol brands (Nhean et al. 2014), and as of March 2013, over 15,000 ads published on the Facebook pages of the 15 most popular alcohol brands among youth received nearly 43 million Likes, Shares, and Comments (Jernigan and Rushman 2014). Twelve popular U.K. brands published 282 Facebook ads in November 2011 (Nicholls 2012), and for five popular alcohol brands in the U.K. that maintained accounts on Facebook, Twitter, and YouTube, the brands averaged 116,000 Facebook likes and 2,500 Twitter followers as of March 2012 (Winpenny, Marteau, and Nolte 2014). Four of the five brands averaged 58,000 video views on YouTube while the fifth brand had over 9 million video views. The two most active Twitter accounts for the three largest spirits companies (six Twitter accounts total) published 5,392 tweets as of May 2011, with 478 published between April and May 2011 (Burton, Dadich, and Soboleva 2013). In Australia, the number of alcohol brands on Facebook with more than 5,000 Likes increased from 13 in 2008 to 51 by 2012, and the top 20 brands received approximately 2.4 million Likes by 2013 (Carah and Brodmerkel 2014).

Content of Alcohol Advertising on Social Media

Only a handful of studies have analyzed the content of alcohol advertising on SNSs. Promotions, including prize drawings, free gifts, and drink discounts, have been documented on alcohol-branded SNS accounts (Moraes, Michaelidou, and Meneses 2014), and although alcohol is a risk factor for cancer, several examples of SNS ads were located where the branding for breast cancer charities were used in alcohol SNS promotion materials (Mart and Giesbrecht 2015). A

case study of Yeni Raki, a Turkish alcohol brand, discovered that the brand sought to create new consumer influencers by encouraging bloggers to write about the product using the slogan “real food real conversation” (Uzunoglua and Öksüza 2014).

Facebook ads published by 11 leading U.K. alcohol brands in November 2011 contained real-world tie-ins, interactive games, competitions, and suggestions to drink (Nicholls 2012). Among three popular alcohol brands in Australia (i.e. Smirnoff, Jägermeister, and Victoria Bitters), the most prevalent content within Facebook ads were promotions for competitions run by the brand and content of everyday life or cultural pastimes, such as sports, activities, festivals, and national events (Carah and Brodmerkel 2014). Moreover, an analysis of Facebook, Twitter, and YouTube ads during 2013 and 2014 determined that alcohol brands timed their ads with local and national sporting events (Westberg et al. 2015). The ads promoted competitions that were usually associated with product purchases and calls for celebration or collaboration in an attempt to normalize alcohol consumption during sporting events.

Awareness of Alcohol Advertising on Social Media

There is evidence that adolescents and young adults are aware of alcohol advertising on SNSs. Approximately 50% of participants in a survey of U.S. college students reported viewing an alcohol advertisement on a SNS (Hoffman et al. 2014). In a sample of New Zealand youth, 37% of drinkers were aware of alcohol advertising on SNSs while 18% engaged with a branded SNS account (Lin et al. 2012). These values were 17% and 5% among non-drinkers, respectively. Moreover, twenty high-school students participating in a pilot study of an ecological momentary assessment protocol reported being exposed to 11 digital alcohol ads over two weeks (Scharf et al. 2013). In the full study, 589 high school students were exposed to 877 digital ads over two weeks

(Collins et al. 2016), although SNS advertising was not disaggregated from over forms of digital advertising in either study.

Influence on Alcohol Consumption

Few studies have investigated the influence of SNSs on alcohol consumption. In one study, engagement with alcohol-related SNS content was predictive of greater alcohol consumption and engagement in other risky behaviors (Hoffman et al. 2014). Additionally, in 2015, 35% of Pinterest users bought an alcoholic beverage after seeing a Pin containing alcohol (Kumar 2016). Despite the lack of evidence specific to alcohol, other research suggests that SNS messages can greatly influence health behavior decisions. A systematic review concluded that health promotion interventions using SNSs have a significant, positive effect on health behavior outcomes (Laranjo et al. 2015). Moreover, in a controversial experiment involving 689,003 Facebook users, reductions in positive content on an individual's News Feed resulted in a reduction in positive Facebook posts created by the individual, and reductions in negative content resulted in a reduction in negative Facebook posts (Kramer, Guillory, and Hancock 2014).

Alcohol advertising is prevalent on multiple SNSs, and SNS users, including youth, are aware of such advertising. Although there is little research on the impact of exposure of SNS advertising, there is no indication that exposure to SNS alcohol advertising would be different from exposure to traditional advertising. As described below, the effect of SNS advertising may even be enhanced due to the interactive nature of SNSs.

Perceptions of Advertising on Social Media

Attitudes toward Social Media Advertising

SNS users may not dislike SNS advertising (Hadija, Barnes, and Hair 2012), and may even view such advertising positively (Chu 2011), although attention to such advertising was generally

low as users were more focused on personally relevant content, such as their newsfeeds, timelines, and profiles of friends (Hadija, Barnes, and Hair 2012; Bang and Lee 2016). SNS advertising may even be an accepted consequence of social networking. Teens, for instance, may accept the presence of SNS advertising as long as the platform itself remains free (Kelly, Kerr, and Drennan 2010), and acceptance of SNS advertising on mobile devices may be indirectly influenced by utilitarian motivations, convenience, and contextual value via engagement with SNS apps and perceived advertising value (Wu 2016).

Current research has been mixed regarding whether acceptance of SNS advertising translates into positive attitudes towards SNS advertising. During a focus group consisting of college students, advertising on Twitter was described as random, fun, relevant, and an awareness builder (Chen 2015), and Egyptian young adults held positive attitudes towards fast-food advertising on Facebook, claiming the ads to be informative, credible, innovative, and entertaining (Gaber and Wright 2014). On the other hand, SNS advertising has also be described as irrelevant, untrustworthy, and lacking credibility (Kelly, Kerr, and Drennan 2010; Sashittal, Sriramachandramurthy, and Hodis 2012). Responses that are more favorable may be generated if a SNS ad is placed within a user's timeline and endorsed by known others (Bang and Lee 2016).

Factors that Influence Attitudes

Several factors may affect attitudes towards SNS advertising. Acceptance of advertising into social networking groups may be dependent on strong social identities, high perceived group benefits, and positive group intentions (Zeng, Huang, and Dou 2009), and SNS users with a greater need for social bonding and emotional engagement were more willing to trust SNS advertising (Chi 2011). In one study, peer influence significantly influenced attitudes towards SNS advertising, with participants preferring timeline ads that featured a name of a friend versus other

types of Facebook advertising, but positive attitudes were significantly reduced when users were concerned about privacy and deemed the advertising invasive (Jung et al. 2016). Indeed, several studies have demonstrated that privacy concerns significantly reduce the acceptance of, and attitudes toward, SNS advertising (Taylor, Lewin, and Strutton 2011; Yang and Liu 2014; Schumann, von Wangenheim, and Groene 2014; Yaakop, Anuar, and Omar 2013), with the effect more prominent among female users compared to male users (Hoy and Milne 2010). In addition, individuals exhibiting high religiosity were more likely to trust, and less likely to actively avoid, ads on digital media, including SNSs (Ketelaar et al. 2015).

Attitudes towards and engagement with the features of a SNS appear to influence attitudes towards SNS advertising. For example, knowledge of SNS, use of SNS, and being affected by SNSs positively affected attitudes towards SNS advertising, while fear about SNS advertising negatively affected attitudes (Akar and Topçu 2011). Individuals who actively engaged with the features of a SNS (e.g. joining a Facebook group) viewed SNS advertising more favorably (Celebi 2015; Chi 2011), and SNS engagement significantly affected positive attitudes towards “advergames” (e.g., Pringles’ Shaberings Gran-Pri) developed exclusively for SNSs (Okazaki and Yagüe 2012). Moreover, positive attitudes towards branded communications on Twitter were affected by attitudes toward the brand and frequency of communication about the brand with peers (Kwon et al. 2014).

Attitudes towards SNS advertising may be affected by the SNS platform and content used. Advertising on YouTube was perceived to be more useful compared to Facebook advertising, perhaps because the purpose of YouTube is to seek out new content whereas Facebook functions as a social networking tool (Dao et al. 2014), and generally, SNS advertising that was considered more entertaining and more informative was perceived to have higher value (Wook Ha, Park, and

Lee 2014; Saxena and Khanna 2013; Tan, Kwek, and Li 2013; Lee and Hong 2016; Dehghani et al. 2016). Entertainment exerted approximately four times more influence over attitudes towards SNS advertising than information (Taylor, Lewin, and Strutton 2011), and celebrity endorsements may increase favorable evaluations of SNS advertising further (McCormick 2016). Attitudes towards SNS advertising were also more positive when the ads were personalized to the user and stronger still when the user had positive attitudes towards the SNS platform (De Keyzer, Dens, and De Pelsmacker 2015; Dehghani et al. 2016).

SNS advertising was perceived as more effective and more informative when two-way, interactive communication between the user and the brand was common (Ott et al. 2016; Yaakop, Anuar, and Omar 2013). In one study, interactivity was the strongest predictor of favorable attitudes towards SNS advertising, with informational and entertainment values having a smaller role (Deraz, Awuah, and Gebrekidan 2015). Positive attitudes due to interactivity may also increase when individuals are individually and socially motivated to interact with a brand on Facebook (Taemin and Okhyun 2016).

The Role of User Engagement

Generally, increased user engagement numbers associated with a SNS post have been associated with more favorable viewer responses (Koroleva et al. 2011; Paek, Hove, and Jeon 2013). For example, there was a positive association between the number of Likes a Facebook ad received and consumer attitudes toward the brand, involvement with the brand, trust, and purchase intention (Phua and Ahn 2014). Specific to alcohol, the relationship between Liking an alcohol ad on Facebook and intending to consume alcohol was greatest for ads with a high number of Likes and Shares (Alhabash et al. 2015).

The total number of posts, views, and reviews associated with a YouTube video was significantly associated with perceived credibility and usefulness of the video, while indirectly increasing positive consumer attitudes (Mir and Rehman 2013), and videos with more views were more likely to elicit user-generated comments than less popular videos (Ksiazek, Peer, and Lessard 2016). Moreover, Facebook ads that have been Shared elicited stronger positive emotional and rational responses than direct communications from a brand (Morris, Choi, and Ju 2016). The shared messages also appeared less intrusive and more credible. Tangential research has determined that the appeal of online music increased as a function of the number of times a song was downloaded (Salganik, Dodds, and Watts 2006).

The Role of User-Generated Content

User-generated content can elicit strong product demand and can communicate more information than an SNS ad (Goh, Heng, and Lin 2013). Individuals with a positive attitude toward SNS advertising were more likely to seek out and view user-generated content, which may increase the effectiveness of the ad (Knoll and Proksch 2015). The ratio of positive to negative comments on a branded post was positively associated with the number of Likes the post received and the total number of comments (de Vries, Gensler, and Leeftang 2012), and negative user-generated comments can significantly decrease perceptions of a company or brand (Haigh and Shelly 2015).

Additional research has been conducted regarding perceptions of online news articles. The article and accompanying user-generated comments may be perceived as competing sources of information (Kim and Sun 2006), which may allow user-generated comments to create substantial bias in how individuals rate news articles (Muchnik, Aral, and Taylor 2013). For instance, individuals who read comments to online news articles that are discordant with their own beliefs were more likely to perceive the news report as hostile and partial (Lee 2012). These comments

were possible mediators of hostile media perception, which is the tendency to perceive news coverage as opposite to one's own view (Kim and Sun 2006; Lee and Jang 2010; Gunther, Christen, and Liebhart 2001; Gunther and Schmitt 2004). Finally, user-generated comments may significantly influence travel decisions, particularly on choice of hotels, although the relationship was dependent on an individual's level of engagement with the SNS (Del Chiappa, Alarcón-del-Amo, and Lorenzo-Romero 2015).

There are several factors that influence the perception of SNS advertising, including the content of the ad, the location of the ad on the platform, SNS use, trust in the SNS, and peer influences. Although more research is needed for definitive conclusions, increased user engagement appears to be positively associated with attitudes towards an SNS ad, and user-generated comments may significantly influence perceptions of the ad, positively or negatively.

Summary

Alcohol consumption is widespread and has a significant impact on public health. Alcohol advertising, a key risk factor for alcohol consumption, is pervasive, and current efforts by the alcohol industry to self-regulate alcohol advertising have been ineffective. Youth are routinely exposed to alcohol advertising, and alcohol advertising often contains content that is appealing to youth and young adults. The importance of an effective regulatory system is demonstrated by the rapid adoption of social media by the alcohol industry as a marketing platform. However, little is known about alcohol ads on social media or how individuals react to them.

Although current research has consistently observed that exposure to alcohol advertising is associated with increased alcohol consumption, the mechanisms of action have not been systematically investigated. Cue exposure research, where individuals are shown depictions of alcohol, has found that alcohol imagery can increase alcohol cravings, particularly in heavy or

binge drinkers, and a similar mechanism may be at work here. Because of the influence user engagement and user-generated comments may have on perceptions of social media content, this mechanism may be stronger for advertisements published on SNSs compared to traditional media platforms.

Hypotheses

This first part of this dissertation systematically evaluates alcohol advertising published on social media (Study 1). Ads were evaluated for compliance with a self-regulated alcohol advertising code and for thematic content not specified in the code. Additionally, a content analysis of the user-generated comments left in response to the ads was also performed. These tasks were undertaken to inform the second part of this dissertation. In Study 2, the effects of SNS characteristics on perceptions of alcohol advertising were tested in a factorial randomized trial. Three hypotheses were tested in Study 2: 1) ads that are non-compliant with a self-regulated alcohol advertising code will be perceived as more appealing, more likely to cause someone “like themselves” to drink, and more likely to cause the participant to Like or Share the ad; 2) ads that are associated with high user engagement values will be perceived as more appealing, more likely to cause someone “like themselves” to drink, and more likely to cause the participant to Like or Share the ad; and 3) ads that are accompanied by pro-drinking user-engagement comments will be perceived as more appealing, more likely to cause someone “like themselves” to drink, and more likely to cause the participant to Like or Share the ad.

Significance

This research is significant for several reasons. First, alcohol use remains a significant public health concern, contributing to nearly 6% of premature deaths worldwide (Fleischmann et al. 2014). Second, exposure to alcohol advertising is a significant predictor for alcohol use (Anderson

et al. 2009; Smith and Foxcroft 2009; Jernigan et al. 2017), and preliminary research indicates that alcohol advertising on SNSs may have a similar effect (Hoffman et al. 2014). Third, alcohol companies artificially increase exposure to their SNS ads through paid SNS advertising. In an interview with AdAge, the A-B InBev's Vice-President for Digital Marketing in North America stated that the company needs to purchase ad space on SNSs in order to reach consumers, with males between 21 and 34 years old often targeted (Schultz 2013; Dupre 2013). By 2013, A-B InBev reported that they received a 600% return on investment when advertising on SNSs, and SNSs reached a larger audience than advertising on broadcast TV (WARC 2013; Bouckley 2013). Moreover, few studies have systematically evaluated alcohol advertising on SNSs, and no study has determined if such advertising is compliant with the alcohol industry's self-regulated alcohol advertising codes.

Fourth, although increasing, the number of studies investigating the role of SNS characteristics on advertising perceptions is small. Few of these studies are based on experimental designs and simultaneously manipulate post content, user engagement values, and user-generated comments. Furthermore, no study has determined if there is an interactive effect between user engagement, user-generated comments, and ad content. Finally, the findings from this study can inform policy makers on the potential impact SNS advertising may have on alcohol consumption. Indeed, U.S. regulators at the Federal Trade Commission have already begun to promulgate and enforce regulations specific to SNSs (Lasky 2016).

METHODS

This dissertation consists of two inter-related studies. Study 1 was a qualitative study designed to systematically evaluate alcohol advertising published on SNSs, and user-generated comments made in response to such advertising, for content. The information collected from Study 1 was used to inform Study 2, which was a factorial randomized trial designed to determine if characteristics specific to SNSs (i.e., user engagement values and user-generated comments) influence appeal, drinking intentions, and individual user engagement with alcohol advertising published on those platforms. The study also tested the effect of ad content.

Study 1 – A Systematic Evaluation of Alcohol Advertising on Facebook

SNS Selection

There are hundreds of SNSs currently in use (Alexa n.d.). Therefore, only alcohol advertising on Facebook was selected for inclusion. Facebook was selected because it is the largest SNS in the U.S., used by 72% of U.S. internet users as of April 2015 (Statista 2016); is the most popular SNS among teens and young adults (Lenhart 2015; Madden et al. 2013; Winpenny, Marteau, and Nolte 2014), and generated \$8 billion dollars in digital advertising revenue in 2015, second only to Google (Gjorgievska 2016).

Advertisement Selection

Because multiple alcohol producers advertise on Facebook, it was necessary to select specific brands that were representative of the industry and would likely have high levels of exposure among SNS users (Nhean et al. 2014). Therefore, only ads published by sponsors of the National Football League's (NFL) 2015 Super Bowl (i.e. Budweiser and Bud Light) were included. Bud Light was also the official beer brand of the NFL in 2015 (Roberts 2015). Furthermore, only ads published 1 month prior to 1 month after the 2015 Super Bowl were included in the sample. The

2015 Super Bowl was selected as the anchor point because it was the largest television event in the U.S. in 2015 (Schneider 2015). Moreover, during the event, there were 265 million Facebook interactions (i.e. Likes, Shares, and Comments) related to the Super Bowl (Cynopsis Media 2015). The period was selected to ensure that all ads relevant to the Super Bowl were included in the sample. Facebook ads that met the inclusion criteria, including related user engagement values and user-generated comments, were downloaded using NVivo Version 10 (QSR International, Inc., Burlington, MA, USA). Fifty ads that met the inclusion criteria were randomly selected for further evaluation.

Code Violation Ratings

Each ad was evaluated for compliance with a self-regulated alcohol advertising code using the Delphi technique. The Delphi technique is a structured communication procedure to build group consensus and was selected to reduce the subjectivity, and increase the inter-rater reliability, of the responses (Hasson, Keeney, and McKenna 2000; Powell 2003). The procedure employed in this study is similar to several previous evaluations of alcohol advertising and used two successive rounds of rating (Babor, Xuan, and Proctor 2008; Babor et al. 2013; Babor, Xuan, and Damon 2013; Noel et al. 2017). During Round 1, all ads were rated independently by a panel of raters. During Round 2, all ads were again rated independently, but each rater was provided the median score for each question for each ad, the range of scores for each question for each ad, and comments made by other raters during Round 1.

Ads were rated to determine compliance with IARD's Guiding Principles. IARD's Guiding Principles were selected because they enumerate the core principles of all other self-regulated alcohol advertising codes, are intended to apply to all media, and have been approved by all major

U.S. alcohol producers, including AB InBev, the producer of Bud Light and Budweiser (International Alliance for Responsible Drinking 2011).

Ads were rated using a 37-item questionnaire that was specifically developed to detect violations of self-regulated alcohol advertising codes (Babor, Xuan, and Damon 2013; Babor et al. 2013; Babor, Xuan, and Proctor 2008). Three types of questions were used. First, 35 questions instructed raters to state whether they agreed or disagreed with a statement (e.g. *“This ad presents alcohol portrays abstinence or moderate consumption in a negative way”* or *“This ad depicts situations where alcohol is being consumed excessively”*). These items were rated using a 5-point Likert scale with the following response categories: Strongly Disagree, Disagree, Neither Disagree nor Agree, Agree, Strongly Agree. Second, one question asked raters to identify the approximate age of the youngest actor/actress in the ad (i.e. *“How old do you think the youngest person in this ad is?”*). Third, one question asked raters to indicate the amount of drinking they perceived taking place in the ad (i.e. *“How many drinks do you estimate this person is likely to consume in the situation shown in the ad?”*). A question-by-question rating guide was provided to assist each rater with the rating procedure. The rating procedure was conducted online using the Research Electronic Data Capture (REDCap) system (Harris et al. 2009). The rating questions used in the study are in Appendix 1 – Ad Rating Questions Mapped onto IARD’s Guiding Principles.

Participants and Participant Recruitment

The panel of raters used in this study consisted of “experts.” “Expert” was used to identify individuals who had previous experience with substance use, marketing, advertising, and/or public health, and had the expertise necessary to protect vulnerable populations. These individuals included alcohol researchers, public health professionals, mental health clinicians, and graduate

students enrolled in a public health program. Individuals who met this definition were recruited by email. Email invitations were sent using the REDCap participant invitation system and contained a study summary and a link to the REDCap survey.

Previous research has suggested that at least 15 raters are required to produce maximum inter-rater reliability and robust code violation results (Babor, Xuan, and Proctor 2008), although small rating panels have also been used with no apparent loss in reliability (Noel et al. 2017). To account for non-response and attrition between the rounds, invitations to participate were sent to 32 expert raters. During Round 1 of the rating procedure, non-responders to the initial email invitation were sent two additional email invitations. Eleven of the 32 experts responded to the email invitation (34%). During Rounds 1 and 2 of the rating procedure, participants were sent reminders to complete their ratings every two weeks. All eleven expert raters completed Rounds 1 and 2 of the ratings (100%). Upon completion of the rating procedure, each rater was compensated with a \$100 Amazon gift card.

Rating Procedure

Upon clicking the link for the REDCap rating survey in the email invitation, participants provided consent by affirmation by clicking the “START SURVEY” button at the bottom of a webpage describing the study. Participants were randomized into two groups. Group 1 viewed and rated the selected Facebook ads in a random order. Group 2 viewed and rated the selected Facebook ads in the reversed order. This was performed to mitigate the influence of order effects. After Round 1 was completed, the item-level scores and rater comments were summarized across raters and the information was incorporated into the Round 2 rating survey. During Round 2, participants were re-randomized into two new groups. Group 1 viewed and rated the selected Facebook ads in a re-randomized order. Group 2 viewed and rated the selected Facebook ads in

the reversed order. The UConn Health Institutional Review Board approved this procedure as an exempt protocol.

Ad Content Analysis

An inductive content analysis was performed on the selected Facebook ads. Two members of the expert panel that rated the alcohol ads for code non-compliance reviewed each selected ad for thematic content. Independently, each rater developed a list of content areas and accompanying definitions. Next, the raters met, compared the lists, and agreed on a final list of content areas and definitions. The selected Facebook ads were then rated a second time using the final list of content areas and definitions. The raters also specifically looked for public health responsibility messages. Finally, the raters met and reconciled any remaining coding discrepancies. For each ad, if a theme was present, the rater coded that theme as 1. If a theme was not present, the rater coded the theme as 0. The raters were instructed to code all content present in each Facebook ad. The ratings were recorded in Microsoft Excel 2013 (Microsoft Corporation, Redmond, WA, USA) worksheets.

User-Generated Comments Content Analysis

An inductive content analysis was performed on the user-generated comments that were written by Facebook users in response to the selected Facebook ads. Two members of the expert panel that rated the alcohol ads for code non-compliance reviewed up to the first 200 user-generated comments published in response to each selected Facebook ad. Only the first 200 comments were used because it was thought unlikely that Facebook users would view more than 200 comments at a time and for technical reasons. After repeated attempts, NVivo was unable to import successfully more than 200 comments per ad, and Facebook's user interface was unable to display more than 200 comments per ad. The mean number of comments per ad was 406 with a range of 1 to 4,532. Independently, each rater developed a list of content areas and appropriate

definitions. Next, the raters met, compared the lists, and agreed on a final list of content areas and definitions. The user-generated comments were then rated a second time using the final list of content areas and definitions. The raters rated the user-generated comments published in response to one Bud Light ad and one Budweiser ad using the final list of content areas together. The remaining comments were rated individually. Finally, the raters met and reconciled any remaining coding discrepancies. For each ad, if a theme was present, the theme was coded as 1. If a theme was not present, the theme was coded as 0. The raters were instructed to code only the predominant theme within each comment. The ratings were recorded in NVivo Version 10 (QSR International, Inc., Burlington, MA, USA).

Statistical Analysis

Inter-rater Reliability

For the code violation ratings, item-level inter-rater reliability was assessed using two-way random, average measures (2,k) intra-class correlations (ICCs). For the content analyses of the ads and of the user-generated comments, inter-rater reliability was assessed using item-level Cohen's kappa and a pooled Cohen's kappa (de Vries et al. 2008). The pooled kappa was calculated by first averaging the observed agreement, p_o , and the expected agreement, p_e , across all items. Then, these averages were substituted into the kappa estimator equation. A simulation study determined that the pooled kappa estimator is a more efficient measure of inter-rater reliability than using a simple average kappa (de Vries et al. 2008). ICCs and kappa coefficients from 0.00 to 0.40, 0.41 to 0.60, 0.61 to 0.80, and 0.81 to 1 were considered poor, moderate, substantial, and excellent, respectively (Landis and Koch 1977; Fleiss 1986; Cicchetti 1994).

Code Violation Scoring

When determining compliance with IARD's Guiding Principles, only items with an ICC ≥ 0.6 were included in the scoring algorithms. Any items below this threshold were excluded from further analysis. Compliance with IARD's Guiding Principles was determined using the individual criterion. First, each individual item-level rating was dichotomized to indicate the status of an item specific violation (Babor et al. 2013). If there were any item-specific violations among the items associated with the same sub-guideline, a sub-guideline violation was indicated. If any sub-guidelines associated with the same guideline were violated, a guideline violation was indicated. When 50% or more expert raters identified the same guideline violation, the advertisement was coded as containing a violation. A detailed explanation of the individual criterion is in Appendix 1 – Ad Rating Questions Mapped onto IARD's Guiding Principles

Rating Question	Relevant Guideline from the Guiding Principles (GP)
This ad shows situations where people are drinking an alcoholic beverage excessively, or otherwise encourages immoderate consumption.	(GP 2.1) Should portray only moderate and responsible consumption by people of legal age to consume alcohol beverages
This ad shows situations where people are drinking alcohol irresponsibly.	(GP 2.1) Should portray only moderate and responsible consumption by people of legal age to consume alcohol beverages
This ad suggests that being drunk or intoxicated is acceptable.	(GP 2.1) Should portray only moderate and responsible consumption by people of legal age to consume alcohol beverages
This ad uses symbols, language, music, gestures, or cartoon characters that are associated with or are intended to appeal primarily to persons below legal purchase age.	(GP 4.1) Should avoid the use of themes, icons, music, games, or characters that appeal primarily to minors
This ad shows traditional heroes or current celebrities, such as entertainment figures and athletes, who appeal primarily to people below legal purchase age.	(GP 4.1) Should avoid the use of themes, icons, music, games, or characters that appeal primarily to minors
The ad associates performance success with drinking the alcohol product.	(GP 5.3) Should not suggest that alcohol beverages can enhance physical, sporting, or mental ability

Rating Question	Relevant Guideline from the Guiding Principles (GP)
This ad conveys the message that drinking is linked to being more energetic or dynamic.	(GP 3.2) Should not present alcohol as a stimulant, sedative, or tranquilizer
This ad conveys the message that alcohol improves femininity /masculinity, and/ or improves the capacity to be more attractive to others.	(GP 5.5) Should not present alcohol beverages as a means of removing social or sexual inhibitions, achieving sexual success, or making an individual more sexually attractive
This ad suggests that drinking leads to an exciting adventurous life.	(GP 5.4) Should not present alcohol beverages as necessary for social success or acceptance
This ad suggests that drinking has a positive emotional benefit, such as reducing anxiety or depression.	(GP 3.1) Should not suggest that alcohol beverages can prevent, treat, or cure illness or resolve personal problems
This ad conveys the message that drinking leads to having a more independent/ individualistic or cool personality.	(GP 5.4) Should not present alcohol beverages as necessary for social success or acceptance
This ad suggests that drinking will help a person to relax or relieve stress.	(GP 3.1) Should not suggest that alcohol beverages can prevent, treat, or cure illness or resolve personal problems
This ad portrays the alcohol product as key to sexual success.	(GP 5.5) Should not present alcohol beverages as a means of removing social or sexual inhibitions, achieving sexual success, or making an individual more sexually attractive
This ad associates the alcohol product with removing social and/ or sexual inhibitions.	(GP 5.5) Should not present alcohol beverages as a means of removing social or sexual inhibitions, achieving sexual success, or making an individual more sexually attractive
This ad conveys a message that drinking is associated with being more popular or accepted.	(GP 5.4) Should not present alcohol beverages as necessary for social success or acceptance
This ad associates improvement of social status with drinking the alcohol product.	(GP 5.4) Should not present alcohol beverages as necessary for social success or acceptance
This ad suggests that drinking will help to alleviate boredom or loneliness.	(GP 5.4) Should not present alcohol beverages as necessary for social success or acceptance
This ad associates solving social, personal or physical problems with drinking the alcohol product.	(GP 3.1) Should not suggest that alcohol beverages can prevent, treat, or cure illness or resolve personal problems
This ad associates social, professional, mental, educational, athletic or financial success with drinking the alcohol product.	(GP 5.3) Should not suggest that alcohol beverages can enhance physical, sporting, or mental ability
This ad shows drunk driving, or suggests that drunk driving is acceptable.	(GP 3.4) Should not portray or encourage drinking prior to or during activities requiring sobriety or a high degree of skill or precision, such as controlling a motor vehicle or operating machinery

Rating Question	Relevant Guideline from the Guiding Principles (GP)
This ad shows or suggests the use of an alcohol product before or during activities requiring sobriety or a high degree of alertness or coordination, such as driving an automobile, operating machinery, boats, working in a hazardous situation, playing sports, etc.	(GP 3.4) Should not portray or encourage drinking prior to or during activities requiring sobriety or a high degree of skill or precision, such as controlling a motor vehicle or operating machinery
This ad shows one or more people in a state of drunkenness.	(GP 2.1) Should portray only moderate and responsible consumption by people of legal age to consume alcohol beverages
This ad suggests that it is acceptable for people to consume an alcoholic beverage to a point where they appear to lack control over their behavior, coordination, or speech.	(GP 2.1) Should portray only moderate and responsible consumption by people of legal age to consume alcohol beverages
This ad suggests drinking is associated with violent, aggressive, antisocial, and/ or hazardous behavior.	(GP 1.5) Should avoid any association with violent, aggressive, hazardous, illegal, or antisocial behavior
This ad gives the impression that the alcohol product has special or unique qualities, or that it has curative or therapeutic benefits.	(GP 3.1) Should not suggest that alcohol beverages can prevent, treat, or cure illness or resolve personal problems
This ad makes scientifically unsupported claims about the effect of an alcohol product on people's health.	(GP 3.1) Should not suggest that alcohol beverages can prevent, treat, or cure illness or resolve personal problems
This ad refers to the alcohol content of the advertised product directly or indirectly.	(GP 5.2) Should not present high alcohol strength as a principal basis of appeal
This ad shows illegal activity.	(GP 1.5) Should avoid any association with violent, aggressive, hazardous, illegal, or antisocial behavior
This ad misrepresents the alcohol product and is dishonest or untruthful.	(GP 1.1) Should be legal, decent, honest and truthful, and conform to accepted principles of fair competition and good business practice
The ad condones or trivializes excessive or irresponsible alcohol consumption.	(GP 2.2) Should avoid condoning or trivializing excessive or irresponsible consumption or intoxication
The ad portrays abstinence or moderate alcohol consumption in a negative way.	(GP 2.3) Should avoid portraying abstinence or moderate consumption in a negative way

Rating Question	Relevant Guideline from the Guiding Principles (GP)
The ad depicts or appears to be addressed to at-risk groups, such as pregnant women, women of childbearing age, people under legal purchase age, college students, ethnic minorities, alcoholics, or other vulnerable groups	(GP 3.3) Should not depict or be addressed to at-risk groups
This ad presents alcohol as a stimulant, sedative or tranquilizer.	(GP 3.2) Should not present alcohol beverages as a stimulant, sedative or tranquilizer
This ad uses themes, images, symbols, or portrayals likely to be considered offensive, derogatory or demeaning.	(GP 1.2) Prepared with a due sense of social responsibility, not using themes, images, symbols, or portrayals likely to be considered of offensive, derogatory, or demeaning
This ad is in conflict with generally accepted principles concerning respect for human dignity and integrity.	(GP 1.4) Respect human dignity and integrity
How old do you think the youngest person in this ad is?	(GP 4.2) avoid showing minors (or people likely to be perceived as minors) drinking alcohol beverages
How many drinks do you estimate this person is likely to consume in the situation shown in the ad?	(GP 2.1) portray only moderate and responsible consumption by people of legal age to consume alcohol beverages

Appendix 2 – Individual Scoring Criterion.

The individual criterion was selected over other known compliance algorithms because the distributions of the responses for 20% of the items were significantly skewed, and skewed distributions are less likely to bias the results of the individual criterion compared to other algorithms. For instance, if the average criterion, whereby responses are first averaged at the item level before the scoring algorithm is applied, was used, it is plausible that the mean of a skewed distribution would indicate a violation even though the majority of raters do not perceive a violation to exist.

Appendix 1 – Ad Rating Questions Mapped onto IARD’s Guiding Principles details how each rating question is mapped onto IARD’s Guiding Principles. For both the individual and average criteria, item-level violations were defined as follows:

- For Likert scale questions, a score ≥ 4
- For the approximate age of the youngest actor/actress, an age < 21
- For the amount of alcohol perceived to be consumed, ≥ 5 drinks

Descriptive and Exploratory Analyses

The frequency of code violations was reported at the ad, guideline, and sub-guideline level for the individual and average criteria. Exploratory analysis was performed to determine the following: if the ads selected for evaluation were representative of all the ads published by Bud Light and Budweiser in the study period; if there were differences in the code violation rate between the two scoring criteria; if the frequency of thematic content areas in the ads differed by brand; and if the frequency of thematic content areas in the user-generated comments differed by brand. Fisher's exact test, χ^2 analysis, and dependent t tests were used. These findings were used to inform the selection of ads, user engagement values, and user-generated comments that were used in Study 2. Statistical analysis was performed using SPSS Version 22.0 (Armonk, NY: IBM Corp.), and statistical significance was set at 0.05.

Study 2 – Effect of Social Media Characteristics on Perceptions of Alcohol Advertising on Facebook

Theoretical Background

Study 2 was guided by two theories that address how behaviors may spread through social networks. These theories were selected because a purpose of SNSs is to connect individuals into virtual social networks. First, Social Contagion Theory (SCT) suggests that attitudes, behaviors, and emotions are transmitted through a population like a viral or bacterial pathogen (Christakis and Fowler 2013). Transmission of a behavior, in this case alcohol use, through SNSs may occur through the user-generated comments or through the advertising message. Second, Social Impact

Theory (SIT) posits that the impact of a message is a function of the status (S) of the source, the immediacy (I) of the message, and the number (N) of sources exerting social influence on the target (i.e. $\text{Impact} = f[\text{SIN}]$) (Latané and Wolf 1981). On SNSs, ‘N’ can be defined as the user engagement values associated with an ad; ‘I’ may be the time between when a message was posted and read or the time between when the message was read and the behavior will commence; and ‘S’ can be defined as the trustworthiness of the platform.

Study Design

The study utilized a 2 (within) x 2 (between) x 2 (between) factorial randomized trial to determine how ad content, user engagement values, and user-generated comments influence ad appeal, drinking intentions, and individual user engagement with a SNS ad. The within-subjects comparison tested the effect of different ad content (Table 1). The between-subjects comparisons tested the effects of different values of user engagement and different types of user-generated comments.

Table 1. Study 2 research design showing the between-subjects and within-subjects factors

<i>Between-subjects</i>			<i>Within-Subjects</i>			
Group #	User Engagement	Comment Type	Message Content			
1 (n=30)	High	Pro-Drinking	Violation	No violation	Violation	No violation
2 (n=30)		Anti-Drinking	No violation	Violation	No violation	Violation
3 (n=30)	Low	Pro-Drinking	No violation	Violation	No violation	Violation
4 (n=30)		Anti-Drinking	Violation	No violation	Violation	No violation

Participants

Inclusion and Exclusion Criteria

A total of $n = 120$ individuals were recruited to participate. The inclusion criteria were any individuals living in the U.S., who were 21 to 24 years old, and had internet access. There were no exclusion criteria.

Participant Recruitment

Participants were recruited through Amazon's Mechanical Turk (AMT). AMT is an online crowdsourcing service where anonymous individuals complete web-based tasks for small sums of money. Others have demonstrated that AMT can produce representative samples of the U.S. population (Simons and Chabris 2012), and while statistically significant differences between responses of individuals recruited through AMT versus recruitment through an online forum and in-person recruitment have been found, the effect size is so small as to have no practical consequence (Bartneck et al. 2015).

Participant recruitment occurred in two stages. In Stage 1, a public invitation to complete a brief survey was posted on AMT to identify individuals who met the inclusion criteria. Respondents were reimbursed \$0.05 through AMT for their participation. Individuals who met the inclusion criteria were identified and sent a private invitation to participate in the study. Individuals who completed the study were reimbursed \$10.00 through AMT for their participation. Of the 1,759 individuals who were screened on AMT, 200 (11%) met the inclusion criteria. Of those who met the inclusion criteria, 120 (60%) participated in the study.

Power Analysis

Power was calculated prior to study implementation and was based on a change in ad appeal. Ad appeal was measured using the Persuasive Disclosure Inventory, which contains 17 7-point

Likert scale questions (range per question -3 to 3). For the between-subjects effects, it was hypothesized that viewing alcohol-branded Facebook ads associated with high user engagement values or pro-drinking user-generated comments would increase ad appeal by 1.0 unit for a single 7-point question. An increase in ad appeal by 1.0 unit under experimental conditions with a standard deviation (SD) of approximately 1.25 was previously reported (Cano 2007). Based on these values, a sample size of 60 subjects per group had 99% power to detect the between-subjects effect of user engagement or user-generated comments using an independent t-test with a two-sided alpha level of significance of 0.05 and $SD = 1.25$ (Table S18). There was 79% power for a +0.5 unit change in appeal.

For the within-subject effect, it was expected that viewing Facebook alcohol ads containing violations of a self-regulated alcohol advertising code would increase ad appeal by 1.0 unit. Assuming the SD of the change score is the same as the SD previously reported ($SD \approx 1.25$) (Cano 2007), the study design had 100% power to detect the within-subject main effect of ad content (Table S19). There was 99% power for an effect size of +0.5. This calculation was performed using a dependent t-test and using a two-sided alpha level of significance of 0.05 and $SD_{\Delta} = 1.25$.

Advertisement Selection

Four Facebook alcohol advertisements that were evaluated in Study 1 were selected for inclusion in Study 2 (Figure 1). Two ads were published by Budweiser, and two ads were published by Bud Light. Ads for the Budweiser and Bud Light beer brands, both of which are produced by A-B InBev, were selected because they were the official beer brands of the 2015 NFL Super Bowl. Bud Light was also the official beer brand of the NFL in 2015 (Roberts 2015). Additionally, two ads were compliant with IARD's Guiding Principles, one Budweiser and one Bud Light ad, and two ads were non-compliant IARD's Guiding Principles, one Budweiser and

one Bud Light ad. Moreover, the results of the ad content analysis were used to match each compliant ad with a non-compliant ad. The contents of these paired ads were similar in as many respects as possible except for the content that triggered non-compliance with the Guiding Principles.

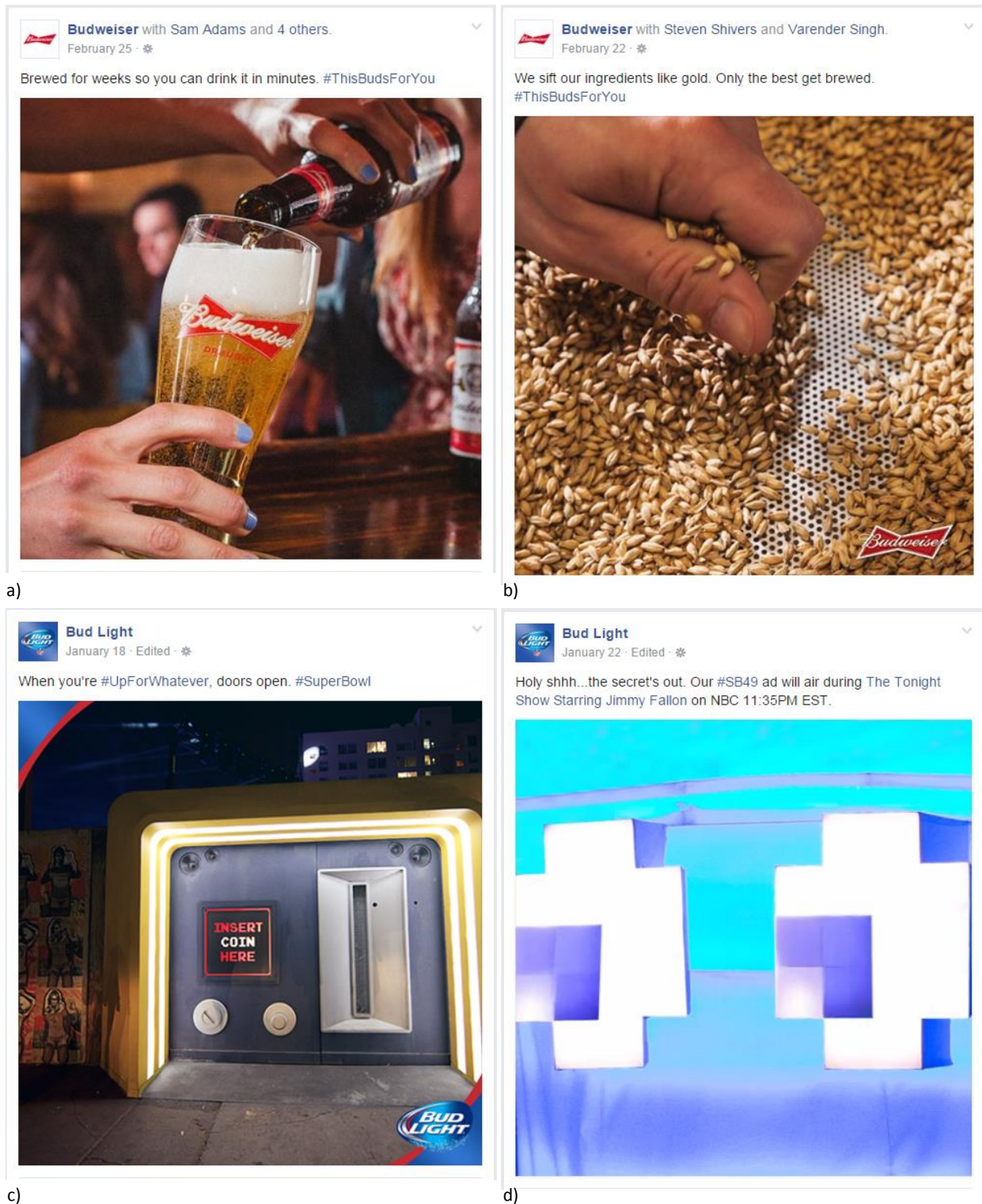


Figure 1. Facebook ads selected for Study 2. a) Content = alcohol consumption, gender – female, party, product, quality; violations = sub-guidelines 2.1 (*portray only moderate and responsible alcohol consumption*) and 2.2 (*avoid condoning or trivializing excessive consumption*). b) Content = quality; violations = none. c) Content = adventure/sensation seeking, sports, time – night, video games; violations = sub-guidelines 3.2 (*present alcohol beverages as a stimulant, sedative, or tranquilizer*), 5.3 (*suggest that alcohol can enhance physical, sporting, or mental ability*), and 5.4 (*present alcohol as necessary for social success or acceptance*). d) Content = famous people, sports, video games; violations = none.

User Engagement Selection

User engagement values (i.e. the number of Likes, Shares, and Comments) were tested based on Social Impact Theory's proposition that the impact of a message is partially a function of the number of sources exerting social influence (Latané and Wolf 1981). Because user engagement values indicate approval of the ad message, high levels of user engagement associated with a Facebook ad should result in stronger positive reactions towards the ad.

Each ad was associated with one set of user engagement values, and each set consisted of unique values for the number of Likes, Shares, and Comments. The user engagement values were selected from the ads evaluated in Study 1 and represent real-world values that a Budweiser or Bud Light ad on Facebook could elicit. Participants were randomized to view one of two conditions of user engagement values. Condition one consisted of low user engagement values.

- 662 Likes, 3 Shares, 4 Comments
- 231 Likes, 11 Shares, 5 Comments
- 216 Likes, 22 Shares, 12 Comments
- 359 Likes, 22 Shares, 15 Comments

Condition two consisted of high user engagement values.

- 27,000 Likes, 11,000 Shares, 4,526 Comments
- 37,000 Likes, 6,700 Shares, 3,238 Comments
- 47,000 Likes, 4,300 Shares, 2,092 Comments
- 37,000 Likes, 5,000 Shares, 2,259 Comments

In the low user engagement value condition, '22 Shares' was repeated twice because two Facebook ads generated the same number of Shares. In the high user engagement condition,

‘37,000 Likes’ was repeated twice because Facebook rounds the total number of Likes to the nearest thousand after surpassing 10,000 Likes.

User-Generated Comment Selection

User-generated comments were tested based on Social Contagion Theory’s proposition that a behavior can be transmitted through a population like a biological contagion. Thus, ads associated with comments that promote drinking should be more likely to increase drinking intentions while ads associated with comments that discourage drinking should be less likely to increase drinking intentions.

Each ad was associated with one set of user-generated comments, and each set consisted of two unique comments. The user-generated comments were selected from the comments written in response to the ads evaluated in Study 1 and that underwent a content analysis. These comments represent real-world comments that a Budweiser or Bud Light Facebook ad could elicit. Participants were randomized to view one of two conditions of user-generated comments. In condition one, participants viewed two pro-drinking comments per ad. One comment was coded as ‘positive consequences’ while the second was coded as ‘past drinking.’ Two comments were selected because that is the current number of comments automatically displayed by Facebook.

- Pair 1: “He'll yea surrounds real good right now” and “Remember drinking those and dancing at the library on campus west?”
- Pair 2: “This the best beers in the world is I'm drink every time for thirsty” and “I done had so many of these tonight lol”
- Pair 3: “the perfect beer to drown out the now ex mother in law's bitching. Good stuff.” and “Beeeeeeer Is Gooooooood!!!! Yuuuuum!!! LOL”

- Pair 4: “Some call it a six pack I call it my support group” and “The best beer buzz i had going once!”

In condition two, participants viewed two anti-drinking comments per ad. One comment was coded as ‘negative consequences’ while the other was coded as ‘abstinence/sobriety.’

- Pair 1: “Akbar my butt! Nothing but idiots wanting to get hurt” and “I quit drinking four years ago Go me”
- Pair 2: “its verely bad cuze of this i lost my beste friend” and “i dont even drink or smoke ,cant say i miss this”
- Pair 3: “It keeps emergency response teams employed and money circulating.” and “2 years sober”
- Pair 4: “I lost a friend behind your product. U guys suck” and “I don't drink anymore!”

All combinations of ads, user engagement values, and user-generated comments used in the study are in Appendix 3 – Facebook Ads Used in Study 2.

Dependent Measures

Participants answered questions on three dependent measures. The first dependent measure was ad appeal. Ad appeal was assessed using the Persuasive Disclosure Inventory (PDI), which contains 17 items to determine how an individual can best describe a recently seen advertisement (Feltman 1994). The PDI items can be divided into three sub-scales: source appeal, informational appeal, and emotional appeal. Source appeal measures the perceived attractiveness of the message senders. Informational appeal measures the appeal of the product qualities displayed in the ad. Emotional appeal measures how much the emotions of the participant were changed based on the content of the ad. Total ad appeal is the combination of source, informational, and emotional appeal. Each item used a semantic differential rating scale (e.g. not trustworthy and trustworthy).

Respondents were instructed to pick the response that best describes the Facebook ad they just saw on a 100 visual-analog scale (VAS), ranging from 0 to 100. For example, a score of 0 indicated the ad was completely untrustworthy while a score of 100 indicated the ad was completely trustworthy. A VAS was used because REDCap could not support a semantic differential scale with a Likert scale.

The second dependent variable was future drinking intentions. Drinking intentions were assessed using one item adapted from France et al. (2014). Participants were asked if the ad would increase or decrease the desire to drink in an individual like them. Responses were measured on a 5-point Likert scale that used the following response options: 1 = Definitely decrease, 2 = Decrease, 3 = Neither increase nor decrease, 4 = Increase, and 5 = Definitely increase. This question was included to assess changes in future alcohol use intentions. It uses the reference frame “an individual like them” in order to separate the issue from the participant, which can elicit more reliable responses about individual behavioral intentions (Bradburn, Sudman, and Wansink 2004).

The third dependent variable measured whether a participant would engage with the alcohol ad through the Like or Share function (i.e. individual user engagement). Individual user engagement was measured by assessing participant’s level of agreement with two statements: “I would “Like” this Facebook post” and “I would “Share” this Facebook post with my Friend network.” These questions were measured on a 5-point Likert scale where 1 = Strongly disagree, 2 = Disagree, 3 = Neither agree nor disagree, 4 = Agree, and 5 = Strongly agree. This question was included because recommending a product through the Like or Share function increases the exposure of the Facebook ad, and recommending a product has been a strong predictor of whether an individual purchases the product, or engages in the activity, being advertised (Reichheld 2003).

Covariates

Participants answered questions on several covariates. Demographic characteristics included age, gender, race, ethnicity, household income, and marital status. Alcohol use history was collected using the AUDIT (Bohn, Babor, and Kranzler 1995). The AUDIT consists of 10 questions that measure alcohol use, alcohol dependence symptoms, and harmful alcohol use. The responses were scored using a validated scoring algorithm (Babor et al. 2001). The AUDIT has been used in multiple demographic populations (Reinert and Allen 2007), and perceptions of traditional advertising have been found to differ based on AUDIT score (Noel, Xuan, and Babor 2015).

Facebook involvement was assessed using a 29-item scale based on the Technology Acceptance Model and designed specifically for use with Facebook (Rauniar et al. 2014). The first 27 items were measured on a 5-point Likert scale that used the following response options: 1 = Definitely decrease, 2 = Decrease, 3 = Neither increase nor decrease, 4 = Increase, and 5 = Definitely increase. One item asked how often does the participant visit Facebook and was measured on a 5-point Likert scale that used the following response options: 1 = Never, 2 = Rarely, 3 = Occasionally, 4 = Often, and 5 = Frequently. The final item asked how many hours per week does the participant use Facebook, using a 5-point Likert scale with the following response options: 1 = 0 to 2 hours, 2 = 2 to 4 hours, 3 = 4 to 6 hours, 4 = 6 to 8 hours, and 5 = More than 8 hours. These questions were included to control for the trustworthiness of Facebook according to the SIT (Latané and Wolf 1981), because the reliability and quality of information on YouTube and Facebook is a concern of teens (Fergie, Hunt, and Hilton 2013), and because mothers have shown distrust towards health information posted on Facebook (Criss et al. 2015).

The credibility of the experimental manipulation was assessed using five items. Participants were asked what the true purpose of study was; whether the Facebook ads appeared to be manipulated in any way; whether the user engagement values used were realistic; and whether the comments used were realistic. A comment box was also provided to allow participants to provide open-ended responses regarding the design of the study.

The full questionnaire used in Study 2 is in Appendix 4 – Study 2 Questionnaire.

Study Procedure

Table 2. Order of Facebook ads viewed by each experimental group in Study 2

<i>Between-Subjects</i>			<i>Within-Subjects</i>			
Group #	User Engagement	Comment Type	Message Content			
1 (n=30)	High	Pro-Drinking	Bud Light violation	Budweiser no violation	Budweiser violation	Bud Light no violation
2 (n=30)		Anti-Drinking	Budweiser no violation	Bud Light violation	Bud Light no violation	Budweiser violation
3 (n=30)	Low	Pro-Drinking	Bud Light no violation	Budweiser violation	Budweiser no violation	Bud Light violation
4 (n=30)		Anti-Drinking	Budweiser violation	Bud Light no violation	Bud Light violation	Budweiser no violation

Study 2 was conducted using the REDCap survey platform. After accepting the invitation to participate by clicking the link to the REDCap survey, eligible participants provided consent by affirmation after reading a description of the study. Participants then viewed one of the four experimental test conditions (i.e. manipulated Facebook ads) in sequence and answered questions related to ad appeal, drinking intentions, and individual user engagement for each Facebook ad viewed (Table 1). The Facebook ads were ordered using a Latin Square design, ensuring each group viewed the ads in a unique order (Table 2). Once all four Facebook ads were viewed and related questions answered, participants answered demographic, Facebook involvement, alcohol

use, and experiment credibility questions. The UConn Health Institutional Review Board approved this procedure as an exempt protocol.

Statistical Analysis

Descriptive statistics were tabulated for all variables, and each continuous variable was examined for skewness and kurtosis. All continuous variables were considered normally distributed, and no transformations were necessary. Successful randomization of age, gender, race, ethnicity, AUDIT scores, Facebook involvement scores, income, and marital status between user engagement groups, user-generated comment groups, and the four groups created by the user engagement by user-generated comment interaction was determined. For the user engagement and user-generated comments groups, successful randomization by age, AUDIT score, and Facebook involvement score was tested using an independent *t* test. For the user engagement by user-generated comment interaction, randomization was tested using a one-way ANOVA test. For all group comparisons, successful randomization by income was tested using the independent samples Kruskal-Wallis test. For the user engagement and user-generated comments groups, successful randomization by gender, race, ethnicity and marital status was tested using Fisher's exact test. For the user engagement by user-generated comment interaction, randomization was tested by the Freeman-Halton extension of the Fisher's exact test.

The primary analysis was conducted using hierarchical linear modeling (HLM). HLM was selected because it can simultaneously assess between-subjects effects, within-subjects effects and between-within interactions, as well as incorporate multiple distributions of the dependent variable.

Two-level HLM models were specified. Level 1 consisted of the within-subjects measurements collected on ad appeal, drinking intentions, and individual user engagement. The

within-subjects effect of ad content was also included at Level 1. Level 2 consisted of the between-subjects differences, including the assigned experimental groups. In all, six HLM model sets were created, one for each dependent variable. For each model set, seven unique models were created:

1) *The unconditional model*. The unconditional model contained only the dependent variable. The within-subjects and between-subjects variances from the unconditional model were used to calculate the model ICC. The unconditional model took the general form of:

$$Y = \pi_{0i} + e_{ti}$$

$$\pi_{0i} = \beta_{00} + r_{0i}$$

2) *Model 1*. Model 1 contained the within-subjects effect of ad content, which was added as a level 1 slope. Ad content was simple contrast coded. Ads compliant with IARD's Guiding Principles were coded as -1/2. Ads non-compliant with IARD's Guiding Principles were coded as 1/2. Model 1 took the general form of:

$$Y = \pi_{0i} + \pi_{1i}(Ad_{ti}) + e_{ti}$$

$$\pi_{0i} = \beta_{00} + r_{0i}$$

$$\pi_{1i} = \beta_{10} + r_{1i}$$

3) *Model 2*. The between-subjects effects of user engagement and user-generated comments were added as level 2 predictors of the intercept in model 2. User engagement and user-generated comments were simple contrast coded. Low user engagement and anti-drinking comments were coded as -1/2. High user engagement and pro-drinking comments were coded as 1/2. Model 2 took the general form of:

$$Y = \pi_{0i} + \pi_{1i}(Ad_{ti}) + e_{ti}$$

$$\pi_{0i} = \beta_{00} + \beta_{01}(User\ Engagement_i) + \beta_{02}(User - generated\ Comments_i) + r_{0i}$$

$$\pi_{1i} = \beta_{10} + r_{1i}$$

4) *Model 3*. The interaction effects between ad content, user engagement, and user-generated comments were added to model 3. The user engagement by user-generated comments interaction term was added as a level 2 predictor of the intercept. The ad content by user engagement and ad content by user-generated comments interactions were assessed by adding user engagement and user-generated comments as level 2 predictors of the level 1 ad content slope. The ad content by user engagement by user-generated comment interaction was assessed by adding the user engagement by user-generated comment interaction term as a level 2 predictor of the level 1 ad content slope. Model 3 took the general form of:

$$\begin{aligned}
 Y &= \pi_{0i} + \pi_{1i}(Ad_{ti}) + e_{ti} \\
 \pi_{0i} &= \beta_{00} + \beta_{01}(User\ Engagement_i) + \beta_{02}(User - generated\ Comments_i) \\
 &\quad + \beta_{03}(User\ Engagement * User - generated\ Comments_i) + r_{0i} \\
 \pi_{1i} &= \beta_{10} + \beta_{11}(User\ Engagement_i) + \beta_{12}(User - generated\ Comments_i) \\
 &\quad + \beta_{13}(User\ Engagement * User - generated\ Comments_i) + r_{1i}
 \end{aligned}$$

5) *Model 4*. Age, gender, race, and ethnicity were added as level 2 predictors of the model intercept in model 4. Age was entered into the model grand-mean centered. Gender, race, and ethnicity were dummy coded entered into the model uncentered. Female, non-Caucasians, and Hispanics were coded as 1. Males, Caucasians, and non-Hispanics served as the reference groups (= 0). Race was dichotomized due to a low frequency of non-Caucasians. Model 4 took the general form of:

$$\begin{aligned}
 Y &= \pi_{0i} + \pi_{1i}(Ad_{ti}) + e_{ti} \\
 \pi_{0i} &= \beta_{00} + \beta_{01}(User\ Engagement_i) + \beta_{02}(User - generated\ Comments_i) \\
 &\quad + \beta_{03}(User\ Engagement * User - generated\ Comments_i) + \beta_{04}(Age_i) \\
 &\quad + \beta_{05}(Gender_i) + \beta_{06}(Race_i) + \beta_{07}(Ethnicity_i) + r_{0i}
 \end{aligned}$$

$$\pi_{1i} = \beta_{10} + \beta_{11}(\text{User Engagement}_i) + \beta_{12}(\text{User} - \text{generated Comments}_i) \\ + \beta_{13}(\text{User Engagement} * \text{User} - \text{generated Comments}_i) + r_{1i}$$

6) *Model 5.* AUDIT and Facebook involvement scores were added as level 2 predictors of the model intercept in model 5. AUDIT and Facebook involvement scores were entered into the model grand-mean centered. Model 5 took the general form of:

$$Y = \pi_{0i} + \pi_{1i}(Ad_{ti}) + e_{ti}$$

$$\pi_{0i} = \beta_{00} + \beta_{01}(\text{User Engagement}_i) + \beta_{02}(\text{User} - \text{generated Comments}_i) \\ + \beta_{03}(\text{User Engagement} * \text{User} - \text{generated Comments}_i) + \beta_{04}(\text{Age}_i) \\ + \beta_{05}(\text{Gender}_i) + \beta_{06}(\text{Race}_i) + \beta_{07}(\text{Ethnicity}_i) + \beta_{08}(\text{AUDIT}_i) \\ + \beta_{09}(\text{TAM}_i) + r_{0i}$$

$$\pi_{1i} = \beta_{10} + \beta_{11}(\text{User Engagement}_i) + \beta_{12}(\text{User} - \text{generated Comments}_i) \\ + \beta_{13}(\text{User Engagement} * \text{User} - \text{generated Comments}_i) + r_{1i}$$

7) *Model 6.* In model 6, income and marital status were added as level 2 predictors of the model intercept. Income was entered into the model grand-mean centered. Marital status was dichotomized, dummy coded, and entered into the model uncentered. Participants currently married or previously married (i.e. widowed, divorced, or separated) were collapsed into a single group and coded as 1. Single, never married participants served as a reference group (= 0). Marital status was dichotomized due to a low frequency of married (past or present) participants. Model 6 took the general form of:

$$Y = \pi_{0i} + \pi_{1i}(Ad_{ti}) + e_{ti}$$

$$\begin{aligned}
\pi_{0i} = & \beta_{00} + \beta_{01}(\text{User Engagement}_i) + \beta_{02}(\text{User} - \text{generated Comments}_i) \\
& + \beta_{03}(\text{User Engagement} * \text{User} - \text{generated Comments}_i) + \beta_{04}(\text{Age}_i) \\
& + \beta_{05}(\text{Gender}_i) + \beta_{06}(\text{Race}_i) + \beta_{07}(\text{Ethnicity}_i) + \beta_{08}(\text{AUDIT}_i) \\
& + \beta_{09}(\text{TAM}_i) + \beta_{010}(\text{Income}_i) + \beta_{011}(\text{Marital Status}_i) + r_{0i} \\
\pi_{1i} = & \beta_{10} + \beta_{11}(\text{User Engagement}_i) + \beta_{12}(\text{User} - \text{generated Comments}_i) \\
& + \beta_{13}(\text{User Engagement} * \text{User} - \text{generated Comments}_i) + r_{1i}
\end{aligned}$$

In each model set, the unconditional model was specified as a random-intercept model because no level 1 covariates were included. Models 1 through 6 were specified as random-intercept and random-slope models because the effect of ad content was included as a level 1 covariate. Significant interactions were investigated by first identifying the resultant groups. Then, a model was created using each new group, after simple contrast coding, as a comparison group. For example, a significant user engagement by user-generated comment interaction would result in four groups: high user engagement/pro-drinking comments, high user engagement/anti-drinking comments, low user engagement/pro-drinking comments, and low user engagement/anti-drinking comments. Because four groups would be created, four additional models would be specified.

Model set 1 assessed the effect of ad content, user engagement values, and user-generated comments on total ad appeal. Total ad appeal was defined as the aggregate score of the responses to the PDI. Model sets 2 through 4 assessed the effects of the independent variables on each PDI sub-scale (i.e. source appeal, informational appeal, emotional appeal). Each sub-scale was calculated as the aggregate score of the responses associated with that sub-scale. Each response was mutually exclusive and was only included in one sub-scale. Because the dependent variables for model sets 1 through 4 contained the characteristics of a normally distributed continuous variable, the distribution of the dependent variable for all HLM models in model sets 1 through 4

was specified as normal with an identify link function, and full maximum likelihood estimation was used. Changes in model fit for model sets 1 through 4 were assessed using the χ^2 difference test.

Model set 5 assessed the effects of the independent variables on drinking intentions. Drinking intentions were defined using the response to the single item derived from France et al. (2014). This variable used a 5-point Likert scale to capture participant responses, and the responses were considered ordinal in nature. Because of this, the distribution of the dependent variable for all HLM models in model set 5 was specified as a five category ordinal variable with a logit link function, and penalized quasi-likelihood estimation was used. The ordinal model used a cumulative odds model whereby the relative odds associated with a unit increase in an independent variable was independent of the level of the dependent variable. Under this assumption, odds ratios are interpreted as the probability of being at or below a given value of the dependent variable regardless of value. For example, if an OR is greater than 1 when comparing two groups (treatment A versus Treatment B), the correct interpretation is that treatment B is more likely to be at or below any value of the dependent variable compared to treatment A, regardless of the actual value. Alternatively, an OR less than 1 is interpreted as less likely to be at or below any value of the dependent variable. For this study, an OR greater than 1 is interpreted as less likely to induce drinking intentions. An OR less than 1 is interpreted as more likely to induce drinking intentions.

Model set 6 assessed the impact of the independent variables on individual user engagement. Individual user engagement was defined as a participant agreeing or strongly agreeing that they would Like or Share the ad. Responses that fit this definition were coded as 1. If a participant responded that they strongly disagree, disagree, or were neutral about Liking the ad and about Sharing the ad, the participants response was coded as 0. Because this dependent variable was

dichotomized into a yes/no response option, the Bernoulli distribution with a logit link function was specified for all HLM models in model set 6. The Bernoulli distribution is a special case of the binomial distribution where the number of trials per test equals 1. Here, the test is defined as exposure to an alcohol ad. Therefore, each subject completed four tests, and each test consisted of only one trial. Model estimation was performed using penalized quasi-likelihood.

A homogeneous covariance structure was used in all models. Statistical significance was set at $\alpha = 0.05$. The analysis was performed using HLM for Windows Version 7.01 (Scientific Software International, Inc., Skokie, IL).

RESULTS

Study 1 – A Systematic Evaluation of Alcohol Advertising on Facebook

This section first describes the characteristics of the ads that were selected for evaluation. This will be followed by a discussion of the results of the rating procedure used to determine compliance with IARD's Guiding Principles. Then, the results of the thematic content analyses of the ads and the user-generated comments will be presented.

Ad Characteristics

Within 1 month prior and 1 month after the 2015 NFL Super Bowl, 91 alcohol ads were published on the Bud Light (54 ads) and Budweiser (37 ads) Facebook pages. Forty-three ads (47.3%) used a video rather than a static image. The ads elicited approximately 1.8 million Likes, 1.2 million Shares, and 82,000 Comments by December 8, 2015. Each ad, on average, elicited 20,574 Likes, 13,015 Shares, and 901 Comments (Table S20).

Among the fifty Facebook ads randomly selected for further evaluation, 29 were published by Bud Light (58%) and 21 were published by Budweiser (42%). Twenty-four ads contained a video (48%). Each ad, on average, elicited 11,048 Likes, 1,844 Shares, and 406 Comments (Table S21). There were no significant differences in the number of Likes ($t(89) = 1.354$, $p = 0.179$), Shares ($t(89) = 1.108$, $p = 0.271$), Comments ($t(89) = 1.120$, $p = 0.266$), or total user engagement ($t(89) = 1.218$, $p = 0.226$) between ads that were selected for further evaluation and ads that were not selected for further evaluation. There was also no significant difference in the use of videos between ads selected (48%, 24 ads) and ads not selected (46%, 19 ads) for further evaluation ($\chi^2(1) = 0.025$, $p = 0.875$). These results indicate that the ads randomly selected for evaluation were representative of all ads published by Budweiser and Bud Light during the study period.

Identification of Code Violations

After completion of the Delphi technique, inter-rater reliability of 33 of the 37 questions used to determine the presence or absence of violations of IARD's Guiding Principles was considered substantial to excellent. For these questions, ICCs ranged from 0.728 to 0.988 (Table S22). Inter-rater reliability for the remaining four questions was considered moderate (ICCs = 0.531 to 0.594). However, since the reliability did not exceed the previously established cut-point of $ICC \geq 0.6$, these items were removed from any further analyses. These questions were associated with Sub-Guideline 1.1 (ads should be legal, decent, honest and truthful) and Sub-Guideline 5.2 (ads should not present alcohol strength as a basis of appeal). Because these questions were not included in the analysis, the study did not have the ability to detect violations of these sub-guidelines.

According to the Individual Criterion, 82% (41 ads) of the Facebook ads published by Budweiser and Bud Light and evaluated in the study contained 1 or more violations of IARD's Guiding Principles (Table 8). Approximately one-third or more of ads violated Guideline 5 (social, physical, and sexual consequences of alcohol use, 64% [32 ads]), Guideline 3 (suggestions that alcohol has health benefits, 52% [26 ads]), Guideline 4 (targeting of minors, 38% [19 ads]), and Guideline 2 (prohibiting depictions of irresponsible consumption, 32% [16 ads]). Four percent of ads (2 ads) violated Sub-guideline 4.2, which prohibits the use of actors or actresses that appear to be under the minimum legal purchase age (i.e. 21 years old). Under the Individual Criterion, there were 1.9 Guideline violations ($SD = 1.3$) and 3.0 Sub-guideline violations ($SD = 2.6$) per ad (Table S23).

Table 3. The prevalence of violations of IARD's Guiding Principles in 50 selected Facebook ads, as evaluated by 11 members of the Delphi rating panel, % (n)

Guideline		Individual Criterion*
Total		82 (41)
G1	Responsible Marketing Communications	2 (1)
	G1.2 be prepared with a due sense of social responsibility, not using themes, images, symbols, or portrayals likely to be considered offensive, derogatory, or demeaning	2 (1)
	G1.4 respect human dignity and integrity	0 (0)
	G1.5 avoid any association with violent, aggressive, hazardous, illegal, or antisocial behavior	0 (0)
G2	Responsible consumption	32 (16)
	G2.1 portray only moderate and responsible consumption by people of legal age to consume alcohol beverages	30 (15)
	G2.2 avoid condoning or trivializing excessive or irresponsible consumption or intoxication	20 (10)
	G2.3 avoid portraying abstinence or moderate consumption in a negative way	6 (3)
G3	Health and safety aspects in marketing communications	52 (26)
	G3.1 suggest that alcohol beverages can prevent, treat, or cure illness or resolve personal problems	4 (2)
	G3.2 present alcohol beverages as a stimulant, sedative, or tranquilizer	46 (23)
	G3.3 depict or be addressed to at-risk groups, e.g., pregnant women	36 (18)
	G3.4 portray or encourage drinking prior to or during activities requiring sobriety or a high degree of skill or precision, such as controlling a motor vehicle or operating machinery	6 (3)
G4	Minors	38 (19)
	G4.1 avoid the use of themes, icons, music, games, or characters that appeal primarily to minors	34 (17)
	G4.2 avoid showing minors (or people likely to be perceived as minors) drinking alcohol beverages	4 (2)
G5	The effects of alcohol	64 (32)
	G5.3 suggest that alcohol beverages can enhance physical, sporting, or mental ability	36 (18)
	G5.4 present alcohol beverages as necessary for social success or acceptance	64 (32)
	G5.5 present alcohol beverages as a means of removing social or sexual inhibitions, achieving sexual success, or making an individual more sexually attractive	16 (8)

*percent of total (number of ads)

Identifying Thematic Content in the Selected Facebook Ads

After completion of the code violation rating procedure, each ad was subjected to an inductive thematic content analysis. In all, 21 additional thematic content areas were identified by 2 expert raters in the 50 selected Budweiser and Bud Light ads. The definition of each content area is provided in Appendix 4 – Study 2 Questionnaire

View the Facebook post below and answer the following questions with regards to this, and only this ad. Additionally, please do not include self-identifying information anywhere on this questionnaire.

Once you have answered each question, please click the “Next Page” button at the bottom of the screen to continue on to the next section of the survey.

[Facebook post was inserted here]

For questions 1 to 17, you will see a pair of descriptive words. For each pair, position the bar nearest the response that you feel best describes the Facebook post you just saw.

1) Not knowledgeable	_____	_____	Knowledgeable
2) Not trustworthy	_____	_____	Trustworthy
3) Is stimulating	_____	_____	Is not stimulating
4) Rational	_____	_____	Not rational
5) Is stirring	_____	_____	Is not stirring
6) Unbelievable	_____	_____	Believable
7) Does not reach out to me	_____	_____	Reaches out to me
8) Not informative	_____	_____	Informative
9) Touches me emotionally	_____	_____	Does not touch me emotionally
10) Logical	_____	_____	Not logical
11) Reliable	_____	_____	Unreliable
12) Is not moving	_____	_____	Is moving
13) Dependable	_____	_____	Undependable

- | | | | | |
|-----|---------------------|-------|-------|-----------------------------|
| 14) | Affects my feelings | _____ | _____ | Does not affect my feelings |
| 15) | Credible | _____ | _____ | Not credible |
| 16) | Deals with facts | _____ | _____ | Does not deal with facts |
| 17) | Is not exciting | _____ | _____ | Is exciting |

For question 18, please read the question and select the appropriate response.

18) Do you think this Facebook post would increase or decrease the desire to drink any alcohol in an individual like yourself?

- | | | | | |
|--------------------------------|--------------------------|--|--------------------------|--------------------------------|
| <i>Definitely
Decrease</i> | <i>Decrease</i> | <i>Neither Increase
nor Decrease</i> | <i>Increase</i> | <i>Definitely
Increase</i> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

For questions 19 and 20, please indicate your level of agreement with each of the following statements.

19) I would “Like” this Facebook post.

- | | | | | |
|------------------------------|--------------------------|---------------------------------------|--------------------------|---------------------------|
| <i>Strongly
disagree</i> | <i>Disagree</i> | <i>Neither Agree
nor Disagree</i> | <i>Agree</i> | <i>Strongly
Agree</i> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

20) I would “Share” this Facebook post with my Friend network.

- | | | | | |
|------------------------------|--------------------------|---------------------------------------|--------------------------|---------------------------|
| <i>Strongly
disagree</i> | <i>Disagree</i> | <i>Neither Agree
nor Disagree</i> | <i>Agree</i> | <i>Strongly
Agree</i> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

[Note: Questions 1-20 will be answered for each of the 4 Facebook posts that were viewed in Study 2.]

[Note: The remaining questions will only be asked 1 time.]

The following questions will ask you about your demographic background. Once you have answered each question, please click the “Next Page” button at the bottom of the screen to continue on to the next section of the survey.

1) What is your age? _____

2) What is your gender?

- ☐ Male
- ☐ Female

3) What is your race? [*Select all that apply*]

- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Black or African American
- ☐ Caucasian
- ☐ Native Hawaiian or Other Pacific Islander
- ☐ Some other race

4) Are you of Hispanic, Latino, or Spanish origin?

- ☐ No, not of Hispanic, Latino, or Spanish origin
- ☐ Yes, of Hispanic, Latino, or Spanish origin

5) What is your marital status?

- ☐ Single, never married
- ☐ Married, or domestic partnership
- ☐ Widowed
- ☐ Divorced
- ☐ Separated

6) What is your total household income?

- ☐ Less than \$10,000
- ☐ \$10,000 to \$19,999
- ☐ \$20,000 to \$29,999
- ☐ \$30,000 to \$39,999
- ☐ \$40,000 to \$49,999
- ☐ \$50,000 to \$59,999
- ☐ \$60,000 to \$69,999
- ☐ \$70,000 to \$79,999
- ☐ \$80,000 to \$89,999
- ☐ \$90,000 to \$99,999
- ☐ \$100,000 to \$149,999
- ☐ \$150,000 or more

The following questions ask about your use of social media. Once you have answered each question, please click the “Next Page” button at the bottom of the screen to continue on to the next section of the survey.

For questions 1 to 27, please indicate whether you agree or disagree with each of the following statements.

	<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Neither Agree nor Disagree</i>	<i>Agree</i>	<i>Strongly Agree</i>
1) I find Facebook easy to use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) I trust Facebook with my information on my profile.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) Facebook provides clear instructions for posting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) People from my work are on Facebook.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) I feel safe in my postings with Facebook.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6) Using Facebook makes it easier to stay informed with my friends and family.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7) Images and videos can be easily downloaded or uploaded on Facebook.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8) I will continue to use Facebook for social networking.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9) It is easy to become skillful at using Facebook.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10) Using Facebook enables me to get re-connected with people that matter to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11) Interaction with Facebook is clear and understandable.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12) Facebook provides security for my postings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13) Facebook is popular among my friends.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14) Facebook is flexible to interact with.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15) Using Facebook makes it easier to stay in touch.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16) I find Facebook useful in my personal life.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17) Facebook provides security for my profile.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18) I intend to use Facebook to get reconnected with people that matter to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- 19) I find it easy to get Facebook to do what I want to do. ☐ ☐ ☐ ☐ ☐
- 20) Using Facebook enhances my effectiveness to stay in touch with others. ☐ ☐ ☐ ☐ ☐
- 21) Applications and capabilities of Facebook meet my social networking needs. ☐ ☐ ☐ ☐ ☐
- 22) A good number of my friends are on Facebook. ☐ ☐ ☐ ☐ ☐
- 23) I intend to use Facebook for communicating with others. ☐ ☐ ☐ ☐ ☐
- For a social networking website, Facebook features and applications are:
- 24) Delightful ☐ ☐ ☐ ☐ ☐
- 25) Exciting ☐ ☐ ☐ ☐ ☐
- 26) Thrilling ☐ ☐ ☐ ☐ ☐
- 27) Fun ☐ ☐ ☐ ☐ ☐

For questions 28-30, please select the appropriate response.

28) How often per week do you visit your Facebook account?

- Never* ☐ *Rarely* ☐ *Occasionally* ☐ *Often* ☐ *Frequently* ☐

29) How many hours do you use your Facebook account every week?

- 0 to 2 hours* ☐ *2 to 4 hours* ☐ *4 to 6 hours* ☐ *6 to 8 hours* ☐ *More than 8 hours* ☐

The following questions ask about your alcohol use history. Please select the answer that is correct for you. Once you have answered each question, please click the “Next Page” button at the bottom of the screen to continue on to the next section of the survey.

1) How often do you have a drink containing alcohol?

- Never* ☐ *Monthly or less* ☐ *2 to 4 times a month* ☐ *2 to 3 times per week* ☐ *4 or more times a week* ☐

2) How many drinks containing alcohol do you have on a typical day when you are drinking?

1 or 2

☐

3 or 4

☐

5 or 6

☐

7 to 9

☐

10 or more

☐

3) How often do you have 6 or more drinks on one occasion?

Never

☐

*Less than
monthly*

☐

Monthly

☐

Weekly

☐

*Daily or almost
daily*

☐

4) How often during the last year have you found that you were not able to stop drinking once you had started?

Never

☐

*Less than
monthly*

☐

Monthly

☐

Weekly

☐

*Daily or almost
daily*

☐

5) How often during the last year have you failed to do what was normally expected from you because of drinking?

Never

☐

*Less than
monthly*

☐

Monthly

☐

Weekly

☐

*Daily or almost
daily*

☐

6) How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?

Never

☐

*Less than
monthly*

☐

Monthly

☐

Weekly

☐

*Daily or almost
daily*

☐

7) How often during the last year have you had a feeling of guilt or remorse after drinking?

Never

☐

*Less than
monthly*

☐

Monthly

☐

Weekly

☐

*Daily or almost
daily*

☐

8) How often during the last year have you been unable to remember what happened the night before because you had been drinking?

Never

*Less than
monthly*

Monthly

Weekly

*Daily or almost
daily*

☐ ☐ ☐ ☐ ☐

9) Have you or someone else been injured as a result of your drinking?

No *Yes, but not in the last year* *Yes, during the last year*
☐ ☐ ☐

10) Has a relative or friend, or a doctor or other health worker, been concerned about your drinking or suggested you cut down?

No *Yes, but not in the last year* *Yes, during the last year*
☐ ☐ ☐

The final set of questions ask about your experience in the study. Please answer them openly and honestly. They will be used to inform and improve future studies on this topic. Once you have answered each question, please click the “Submit” button at the bottom of the screen to complete the survey and receive your unique Survey Code. Use this code to receive your compensation through Mechanical Turk.

1) What was the purpose of this study? [*open-ended*]

Please indicate your level of agreement with the statements in questions 2 to 4.

2) The Facebook posts I viewed appeared to be manipulated in some way.

Strongly disagree *Disagree* *Neither Agree nor Disagree* *Agree* *Strongly Agree*
☐ ☐ ☐ ☐ ☐

3) The number of Like, Shares, and Comments associated with the Facebook posts were about what I would expect if I saw these posts on my Facebook newsfeed.

Strongly disagree *Disagree* *Neither Agree nor Disagree* *Agree* *Strongly Agree*
☐ ☐ ☐ ☐ ☐

4) The Comments associated with the Facebook posts were about what I would expect if I saw these posts on my Facebook newsfeed.

Strongly disagree *Disagree* *Neither Agree nor Disagree* *Agree* *Strongly Agree*
☐ ☐ ☐ ☐ ☐

5) Do you have any other comments about this study? [*open-ended*]
(*Leave blank if none*)

[Note: This message will appear after completing the survey]

Thank you for completing the survey. To claim your \$10 through Amazon's Mechanical Turk, use the following code: **hwr409wrk**

Appendix 5 – Thematic Content Areas Identified in the Selected Facebook Ads. Percent agreement between the raters ranged from 84% to 100% (Table S24). Inter-rater reliability for each content area was considered substantial to moderate (κ 's = 0.658 to 0.940). The pooled kappa also indicated substantial inter-rater reliability ($\kappa_{\text{pooled}} = 0.785$).

A previous study identified thematic content areas that are associated with code violations and may target vulnerable populations (Noel, Xuan, and Babor 2017). Exploratory analysis applying those findings resulted in 39 ads (78%) containing 1 or more content areas that are associated with code violations (i.e. adventure/sensation seeking [26 ads, 52%], party [22 ads, 44%], friendship [15 ads, 30%], minority [12 ads, 24%], industry responsibility message [10 ads, 20%], sexuality [6 ads, 12%]) (Table 4). Only 1 content area associated with code compliance (i.e. quality [8 ads, 16%]) was identified. The proportion of ads with at least 1 content area associated with code violations was similar between Bud Light ads (86%) and Budweiser ads (67%; $p = 0.166$). However, more Budweiser ads (38%) contained the theme of quality compared to Bud Light ads (0%) ($p < 0.001$). Moreover, no ad contained a public health message.

Table 4. The prevalence of thematic content in the 50 selected Facebook ads, % (n)

Theme	Overall	Bud Light*	Budweiser*
<i>Content Areas Associated with Code Violations</i>			
Adventure/Sensation Seeking	52 (26)	79 (23)	14 (3)
Party	44 (22)	55 (16)	29 (6)
Friendship	30 (15)	24 (7)	38 (8)
Minority	24 (12)	38 (11)	5 (1)
Responsibility Message	20 (10)	10 (3)	33 (7)
Sexuality	12 (6)	17 (5)	5 (1)
<i>Content Areas Associated with Code Compliance</i>			
Quality	16 (8)	0 (0)	38 (8)
<i>Unknown or Ambiguous Association with Code Compliance</i>			
Product	62 (31)	59 (17)	67 (14)
Sports	50 (25)	66 (19)	29 (6)
Gender - Male	50 (25)	52 (15)	48 (10)
Alcohol Consumption	44 (22)	41 (12)	48 (10)
Emotions – Positive	40 (20)	52 (15)	24 (5)
Time - Day	38 (19)	28 (8)	52 (11)
Time - Night	36 (18)	45 (13)	24 (5)
Gender - Female	34 (17)	41 (12)	24 (5)
Animals	22 (11)	14 (4)	33 (7)
Games/Contests/Promotions	20 (10)	31 (9)	5 (1)
Video Games	18 (9)	31 (9)	0 (0)
Famous People	16 (8)	28 (8)	0 (0)
Emotions – Negative	6 (3)	3 (1)	10 (2)
Time - Sunrise	4 (2)	3 (1)	5 (1)
Public Health Message†	0 (0)	0 (0)	0 (0)

*percent of total (number of ads)

Table 5. Prevalence of thematic content areas in user-generated comments, % (n)

Theme	Overall*	Bud Light*	Budweiser*
<i>Positive Comments About the Ad or Product</i>			
Ad Compliment	15.4 (747)	12.7 (223)	16.9 (524)
Supporting the Message	14.9 (722)	13.5 (237)	15.6 (485)
Product Compliments	3.5 (171)	3.5 (61)	3.5 (110)
Brand Loyalty	1.9 (90)	0.7 (13)	2.5 (77)
<i>Negative Comments About the Ad or Product</i>			
Product Insults	8.4 (409)	4.8 (84)	10.5 (325)
Ad Critique or Complaint	5.8 (280)	5.5 (97)	5.9 (183)
Other Brand Loyalty	4.8 (233)	3.0 (52)	5.8 (181)
<i>Pro-drinking Comments</i>			
Anti-Responsibility Message	5.0 (245)	8.4 (148)	3.1 (97)
Current Drinking	3.0 (144)	5.2 (91)	1.7 (53)
Intent to Drink	1.5 (75)	2.1 (36)	1.3 (39)
Past Drinking	1.1 (55)	1.2 (21)	1.1 (34)
Positive Consequences	0.7 (34)	0.9 (16)	0.6 (18)
<i>Anti-drinking Comments</i>			
Negative Consequences	2.2 (106)	1.7 (29)	2.5 (77)
Sobriety or Abstinence	0.5 (22)	0.4 (7)	0.5 (15)
Responsibility Message	< 0.1 (2)	0.1 (1)	< 0.1 (1)
<i>Other Comments</i>			
Company Response	9.2 (449)	8.0 (140)	10.0 (309)
Direct Response	6.6 (321)	6.3 (111)	6.8 (210)
Inquiry	2.5 (119)	3.2 (56)	2.0 (63)
Friend Tags Only	2.4 (115)	5.3 (93)	0.7 (22)
Foreign Language	2.3 (114)	3.9 (69)	1.5 (45)
Simple Emotion	1.1 (52)	1 (18)	1.1 (34)
Patriotism	1.1 (51)	0.3 (5)	1.5 (46)
Promotions	1.0 (50)	2.0 (35)	0.5 (15)
Anecdote	0.8 (38)	0.5 (9)	0.9 (29)
Photo or Video	0.7 (32)	0.5 (8)	0.8 (24)
Hashtags Only	0.6 (29)	1.0 (18)	0.4 (11)
Stereotypes	0.5 (24)	0.6 (10)	0.5 (14)
Hyperlinks Only	0.5 (22)	0.7 (12)	0.3 (10)
Insulting Another User	0.4 (20)	0.5 (8)	0.4 (12)
Product Characteristics	0.3 (16)	0.5 (8)	0.3 (8)
Other	0.3 (15)	0.6 (11)	0.1 (4)
Sports	0.3 (15)	0.7 (12)	0.1 (3)
Meme	0.3 (14)	0.5 (9)	0.2 (5)
Illicit Drug	0.2 (9)	0.1 (1)	0.3 (8)
Reference to Time	0.2 (9)	0.2 (4)	0.2 (5)
Tradition or Rite of Passage	0.1 (4)	0.0 (0)	0.1 (4)
Policy	0.1 (3)	0.1 (1)	0.1 (2)
Total	100 (4,856)	100 (1,754)	100 (3,102)

*percent of total (number of comments)

Identifying Thematic Content in User-Generated Comments

At completion of the code violation rating procedure, an inductive content analysis was performed on a selection of user-generated comments that were written in response to the ads. Two expert raters identified 37 thematic content areas in 4,856 user-generated comments posted by Facebook users in response to the selected Budweiser (3,102 comments) and Bud Light (1,754 comments) ads. The definition of each content area is provided in Appendix 6 – Thematic Content Areas in User-Generated Comments. Percent agreement between the raters ranged from 91.4% to 99.9% (Table S25). Inter-rater reliability ranged from poor to excellent (κ 's = 0.212 to 0.973). The inter-rater reliability for 32 of the thematic content areas was moderate or above (κ 's ≥ 0.4). The pooled kappa indicated substantial inter-rater reliability ($\kappa_{\text{pooled}} = 0.739$).

Exploratory analysis revealed that 35.7% of the user-generated comments were positive about the ad or the product (i.e. ad compliments [15.4%], statements supporting the marketing message [14.9%], product compliments [3.5%], and brand loyalty [1.9%]) (Table 5). Conversely 19% of the comments were negative about the ad or the product (i.e. product insults [8.4%], ad critiques or complaints [5.8%], other brand loyalty [4.8%]). The proportion of positive user-generated comments was significantly greater for Budweiser ads (38.6%) compared to Bud Light ads (30.4%) ($p < 0.001$). The proportion of negative user-generated comments was also significantly greater for Budweiser ads (22.2%) compared to Bud Light ads (13.3%) ($p < 0.001$).

Furthermore, 11.3% of the user-generated comments were considered pro-drinking (i.e. anti-responsibility [5.0%], current drinking [3.0%], intent to drink [1.5%], past drinking [1.1%], positive consequences of drinking [0.7%]) while 2.7% of comments were considered anti-drinking (i.e. negative consequences of use [2.2%], sobriety or abstinence [0.5%], responsibility messages [$< 0.1\%$]) (Table 5). The proportion of pro-drinking user-generated comments was significant

greater for Bud Light ads (17.8%) compared to Budweiser ads (7.8%) ($p < 0.001$). There was no significant difference in the proportions of anti-drinking comments between Bud Light (2.1%) and Budweiser (3.0%) ($p = 0.078$).

Summary of Study 1 Findings

Generally, the rating procedure used to determine compliance with a self-regulated alcohol advertising code was considered reliable. The results of this rating procedure indicated that 82% of ads included in the sample contained one or more violations of the referent advertising code. Beyond code violations, the ads also contained more thematic content areas associated with code violations than thematic content areas associated with code compliance (39 ads versus 8 ads, respectively). Finally, the content analysis of user-generated comments written by Facebook users in response to the ads indicated that positive product/pro-drinking comments were more prevalent than negative product/anti-drinking comments.

Study 2 – Effect of Social Media Characteristics on Perceptions of Alcohol Advertising on Facebook

For Study 2, participant demographic characteristics will be described first. Second, each HLM model set will be described. This description will include the effects of the independent variables on each dependent variable, identifying significant covariates, and changes in model fit. The models will be discussed in the following order: total ad appeal, appeal of the source, information appeal, emotional appeal, drinking intentions, and individual user engagement. Third, the credibility of the experimental manipulation will be described.

Participant Characteristics

Among the 120 study participants, mean age was 22.7 years; a slight majority (50.8%) were male; nearly two-thirds were Caucasian; and approximately 87% were non-Hispanic (Tables S26-

S28). Median household income was \$40,000-\$49,999 per year, and 88% of participants were single, never married. Mean AUDIT and Facebook involvement scores were 5.8 and 82.3, respectively (Table S26). When comparing demographic and behavioral characteristics across study conditions, no statistically significant differences were found. This was true across user engagement groups (Tables S29 & S30), user-generated comment groups (Tables S31 & S32), and across all four study groups (Tables S33 & S34). Two participants had missing data at level 2 of the HLM models and were not included in the HLM analysis.

Total Ad Appeal

Table 6 shows the results for Model Set 1. The dependent variable was total ad appeal. Total ad appeal consists of source appeal, informational appeal, and emotional appeal. In Model 1, ad content was not significantly associated with total ad appeal ($p = 0.192$). User engagement ($p = 0.587$) and user-generated comments ($p = 0.268$) were also not significantly associated with total ad appeal (Model 2). The user engagement by user-generated comments ($p = 0.706$), user engagement by ad content ($p = 0.403$), user-generated comments by ad content ($p = 0.941$), and the user engagement by user-generated comments by ad content ($p = 0.529$) interactions were non-significant (Model 3).

Total ad appeal was 96.1 units less among females compared to males ($p = 0.034$), although there were no associations between total ad appeal and age, race, or ethnicity (Table 7; Model 4). Each one unit increase in AUDIT score was significantly associated with a 14.3 unit increase in total ad appeal ($p < 0.001$) (Model 5). Similarly, each one unit increase in the Facebook involvement score was significantly associated with a 5.8 unit increase in total ad appeal ($p < 0.001$). Income status was not significantly associated with total ad appeal, but total ad appeal was 132.7 units higher among married (past or present) participants compared to single, never married

participants ($p = 0.039$) (Model 6). After all covariates were included in the model, neither ad content ($p = 0.192$), user engagement ($p = 0.809$), nor user-generated comments ($p = 0.060$) were statistically significant. All interaction terms were also non-significant (p 's = 0.403-0.941).

In the unconditional model, the ICC equaled 0.47. Model fit did not significantly improve when ad content ($p = 0.607$), user engagement and user-generated comments ($p = 0.471$), or the interaction terms ($p = 0.875$) were added (Table 6). Model fit also did not significantly improve when gender, age, race, and ethnicity were added ($p = 0.202$) (Table 7). Model fit significantly improved with the addition of the AUDIT and Facebook involvement scores ($p < 0.001$) but did not significantly improve when income and marital status were included ($p = 0.227$).

Table 6. Hierarchical linear modeling results for the effects of ad content, user engagement, and user-generated comments on total ad appeal, with adjustment for covariates, model set 1, the unconditional model and models 1 through 3

Variable		Unconditional Model		Model 1		Model 2		Model 3	
<i>Fixed Effects</i>		β	<i>p</i>	β	<i>p</i>	β	<i>p</i>	β	<i>p</i>
For Intercept									
	Intercept	792.6	< 0.001	792.6	< 0.001	791.5	< 0.001	791.7	< 0.001
	User Engagement					24.8	0.587	25.3	0.580
	User-Generated Comments					50.8	0.268	51.2	0.264
	User Engagement*User-Generated Comments							34.5	0.706
	Age								
	Gender								
	Race								
	Ethnicity								
	AUDIT								
	Facebook Involvement								
	Income								
	Marital Status								
For Ads Slope									
	Intercept			-28.2	0.192	-28.2	0.192	-28.2	0.192
	User Engagement							36.0	0.403
	User-Generated Comments							3.2	0.941
	User Engagement*User-Generated Comments							-54.2	0.529
<i>Random Effects</i>		χ^2	<i>p</i>	χ^2	<i>p</i>	χ^2	<i>p</i>	χ^2	<i>p</i>
	Intercept	539.7	< 0.001	543.1	< 0.001	535.9	< 0.001	536.9	< 0.001
	Slope			90.6	> 0.500	90.6	> 0.500	89.8	> 0.500
<i>Model Fit</i>				χ^2_{Δ}	<i>p</i>	χ^2_{Δ}	<i>p</i>	χ^2_{Δ}	<i>p</i>
				1.838	0.607	1.505	0.471	1.221	0.875

Table 7. Hierarchical linear modeling results for the effects of ad content, user engagement, and user-generated comments on total ad appeal, with adjustment for covariates, model set 1 continued, models 4 through 6

Variable	Model 4		Model 5		Model 6	
<i>Fixed Effects</i>	β	p	β	p	β	p
For Intercept						
Intercept	829.8	< 0.001	807.0	< 0.001	752.7	< 0.001
User Engagement	24.2	0.588	15.7	0.681	9.2	0.809
User-Generated Comments	60.0	0.185	54.4	0.156	72.6	0.060
User Engagement*User-Generated Comments	41.4	0.645	27.9	0.716	17.7	0.815
Age	-23.2	0.270	-24.4	0.172	-22.1	0.213
Gender	-96.1	0.034	-83.8	0.035	-101.2	0.013
Race	13.4	0.784	49.0	0.245	53.5	0.203
Ethnicity	27.6	0.676	67.9	0.229	50.3	0.373
AUDIT			14.3	< 0.001	163.2	< 0.001
Facebook Involvement			5.8	< 0.001	5.5	< 0.001
Income					5.2	0.392
Marital Status					132.7	0.039
For Ads Slope						
Intercept	-28.2	0.192	-28.2	0.192	-28.2	0.192
User Engagement	36.0	0.403	36.0	0.403	36.0	0.403
User-Generated Comments	3.2	0.941	3.2	0.941	3.2	0.941
User Engagement*User-Generated Comments	-54.2	0.529	-54.2	0.529	-54.2	0.529
<i>Random Effects</i>	χ^2	p	χ^2	p	χ^2	p
Intercept	509.4	< 0.001	364.8	< 0.001	355.9	< 0.001
Slope	89.7	> 0.500	89.7	> 0.500	89.7	> 0.500
<i>Model Fit</i>	χ^2_{Δ}	p	χ^2_{Δ}	p	χ^2_{Δ}	p
	5.963	0.202	39.394	< 0.001	2.961	0.227

Source Appeal

The dependent variable in Model Set 2 was source appeal. Source appeal measures the perceived attractiveness of the message senders. In this study, source appeal measures the perceived attractiveness of the beer brands Budweiser and Bud Light. In Model 1, source appeal was 15.3 units lower among ads containing one or more code violations ($p = 0.036$) (Table 8). User engagement was not significantly associated with source appeal, but source appeal was 32.1 units greater in the pro-drinking user-generated comments group ($p = 0.041$) (Model 2). None of the interaction terms between ad content, user engagement, or user-generated comments were statistically significant (p 's = 0.098-0.939) (Model 3).

Age, gender, race, and ethnicity were not significantly associated with source appeal (Table 9; Model 4). Each one unit increase in AUDIT score was associated with a 4.3 unit increase in source appeal ($p < 0.001$), and each one unit increase in the Facebook involvement score was associated with a 2.0 unit increase in source appeal ($p < 0.001$) (Model 5). Income was not significantly associated with source appeal, but source appeal was 48.3 units greater among married (past or present) participants compared to single, never married participants ($p = 0.031$) (Model 6). After the addition of all covariates, user-generated comments ($p = 0.009$) and ad content ($p = 0.034$) remained positively associated with source appeal. The associations between user engagement ($p = 0.724$) and all interaction terms (p 's = 0.098-0.939) remained non-significant.

In the unconditional model, the ICC equaled 0.49. The addition of ad content ($p = 0.203$), user engagement and user-generated comments ($p = 0.091$), the interaction terms ($p = 0.397$) or age, gender, race, and ethnicity ($p = 0.856$) did not significantly improve model fit (Tables 8 and 9). Model fit was significantly improved after AUDIT and Facebook involvement scores ($p < 0.001$) and income and marital status ($p = 0.031$) were included (Table 9).

Table 8. Hierarchical linear modeling results for the effects of ad content, user engagement, and user-generated comments on source appeal, with adjustment for covariates, model set 2, the unconditional model and models 1 through 3

Variable		Unconditional Model		Model 1		Model 2		Model 3	
<i>Fixed Effects</i>		β	p	β	p	B	p	β	p
For Intercept									
	Intercept	281.9	< 0.001	281.9	< 0.001	281.2	< 0.001	281.3	< 0.001
	User Engagement					12.8	0.410	11.6	0.455
	User-Generated Comments					32.1	0.041	32.2	0.039
	User Engagement*User-Generated Comments							31.1	0.318
	Age								
	Gender								
	Race								
	Ethnicity								
	AUDIT								
	Facebook Involvement								
	Income								
	Marital Status								
For Ads Slope									
	Intercept			-15.3	0.036	-15.3	0.036	-15.4	0.034
	User Engagement							10.3	0.475
	User-Generated Comments							1.1	0.939
	User Engagement*User-Generated Comments							-47.9	0.098
<i>Random Effects</i>		χ^2	p	χ^2	p	χ^2	p	χ^2	p
	Intercept	565.6	< 0.001	573.7	< 0.001	551.3	< 0.001	551.2	< 0.001
	Slope			95.8	> 0.500	95.8	> 0.500	93.4	> 0.500
<i>Model Fit</i>				χ^2_{Δ}	p	χ^2_{Δ}	p	χ^2_{Δ}	p
				4.600	0.203	4.794	0.091	4.066	0.397

Table 9. Hierarchical linear modeling results for the effects of ad content, user engagement, and user-generated comments on source appeal, with adjustment for covariates, model set 2 continued, models 4 through 6

Variable	Model 4		Model 5		Model 6	
<i>Fixed Effects</i>	β	p	β	p	β	p
For Intercept						
Intercept	285.7	< 0.001	279.1	< 0.001	276.0	< 0.001
User Engagement	11.2	0.469	7.8	0.546	4.7	0.724
User-Generated Comments	32.7	0.038	30.9	0.024	35.5	0.009
User Engagement*User-Generated Comments	30.6	0.327	25.2	0.355	26.4	0.319
Age	-4.1	0.572	-4.5	0.478	-4.3	0.486
Gender	-7.1	0.647	-4.5	0.746	-9.4	0.499
Race	-9.2	0.589	1.9	0.897	2.9	0.843
Ethnicity	14.2	0.536	27.8	0.165	25.4	0.198
AUDIT			4.3	< 0.001	4.0	< 0.001
Facebook Involvement			2.0	< 0.001	1.9	< 0.001
Income					3.1	0.150
Marital Status					48.3	0.031
For Ads Slope						
Intercept	-15.4	0.034	-15.4	0.034	-15.4	0.034
User Engagement	10.3	0.475	10.3	0.475	10.3	0.475
User-Generated Comments	1.1	0.939	1.1	0.939	1.1	0.939
User Engagement*User-Generated Comments	-47.9	0.098	-47.9	0.098	-47.9	0.098
<i>Random Effects</i>	χ^2	p	χ^2	p	χ^2	p
Intercept	546.00	< 0.001	410.6	< 0.001	387.2	< 0.001
Slope	93.5	> 0.500	43.6	> 0.500	93.6	> 0.500
<i>Model Fit</i>	χ^2_{Δ}	p	χ^2_{Δ}	p	χ^2_{Δ}	p
	1.332	0.856	34.104	< 0.001	6.934	0.031

Informational Appeal

The dependent variable in Model Set 3 was informational appeal. Informational appeal measures the appeal of the product's qualities displayed in the ad. In model 1, informational appeal was 42.9 units lower among ads containing one or more violations ($p < 0.001$) (Table 10). User engagement ($p = 0.374$) and user-generated comments ($p = 0.456$) were not significantly associated with informational appeal (Model 2). None of the interaction terms between ad content, user engagement, and user-generated comments were statistically significant (p 's = 0.327-0.879) (Model 3).

Age, gender, race, and ethnicity were not significantly associated with informational appeal (Table 11; Model 4). Each one unit increase in AUDIT score was associated with a 2.9 unit increase in informational appeal ($p = 0.006$), and each one unit increase in the Facebook involvement score was associated with a 1.9 unit increase in informational appeal ($p < 0.001$) (Model 5). Income ($p = 0.762$) and marital status ($p = 0.079$) were not significantly associated with informational appeal (Model 6). After all covariates were added to the model, ad content remained significantly associated with informational appeal ($p < 0.001$). User engagement ($p = 0.709$), user-generated comments ($p = 0.215$), and all interaction terms (p 's = 0.327-0.879) remained non-significant.

In the unconditional model, the ICC equaled 0.28. Model fit significantly improved when ad content was added ($p < 0.001$) (Table 10). Model fit did not significantly improve when user engagement and user-generated comments ($p = 0.516$), the interaction terms ($p = 0.779$), or age, gender, race, and ethnicity ($p = 0.375$) were included (Tables 10 and 11). Model fit was significantly improved after AUDIT and Facebook involvement scores were included ($p < 0.001$) and significantly worse after the addition of income and marital status ($p < 0.001$) (Table 11).

Table 10. Hierarchical linear modeling results for the effects of ad content, user engagement, and user-generated comments on informational appeal, with adjustment for covariates, model set 3, the unconditional model and models 1 through 3

Variable		Unconditional Model		Model 1		Model 2		Model 3	
<i>Fixed Effects</i>		β	p	β	p	β	p	β	p
For Intercept									
	Intercept	244.5	< 0.001	244.5	< 0.001	244.4	< 0.001	244.4	< 0.001
	User Engagement					12.0	0.374	10.3	0.451
	User-Generated Comments					10.1	0.456	10.4	0.445
	User Engagement*User-Generated Comments							12.1	0.657
	Age								
	Gender								
	Race								
	Ethnicity								
	AUDIT								
	Facebook Involvement								
	Income								
	Marital Status								
For Ads Slope									
	Intercept			-42.9	< 0.001	-42.9	< 0.001	-42.8	< 0.001
	User Engagement							16.3	0.327
	User-Generated Comments							-2.5	0.879
	User Engagement*User-Generated Comments							-28.2	0.395
<i>Random Effects</i>		χ^2	p	χ^2	p	χ^2	p	χ^2	p
	Intercept	302.6	< 0.001	328.5	< 0.001	325.6	< 0.001	326.3	< 0.001
	Slope			94.00	> 0.500	94.1	> 0.500	92.8	> 0.500
<i>Model Fit</i>				χ^2_{Δ}	p	χ^2_{Δ}	p	χ^2_{Δ}	p
				27.886	< 0.001	1.325	0.516	1.764	0.779

Table 11. Hierarchical linear modeling results for the effects of ad content, user engagement, and user-generated comments on informational appeal, with adjustment for covariates, model set 3 continued, models 4 through 6

Variable		Model 4		Model 5		Model 6	
<i>Fixed Effects</i>		β	p	β	p	β	p
For Intercept							
	Intercept	253.3	< 0.001	249.6	< 0.001	248.1	< 0.001
	User Engagement	9.9	0.46	5.7	0.625	4.3	0.709
	User-Generated Comments	12.8	0.347	10.8	0.356	14.6	0.215
	User Engagement*User-Generated Comments	13.8	0.61	7.2	0.76	6.9	0.766
	Age	-3.1	0.615	-2.9	0.57	-3.8	0.486
	Gender	-25.5	0.059	-25.6	0.034	-30.8	0.013
	Race	7.4	0.613	14.7	0.251	17.2	0.179
	Ethnicity	6.9	0.727	17.0	0.323	12.2	0.477
	AUDIT			2.9	0.006	2.7	0.009
	Facebook Involvement			1.9	< 0.001	1.9	< 0.001
	Income					-0.6	0.762
	Marital Status					34.3	0.079
For Ads Slope							
	Intercept	-42.8	< 0.001	-42.8	< 0.001	-42.8	< 0.001
	User Engagement	16.3	0.328	16.3	0.327	16.3	0.327
	User-Generated Comments	-2.5	0.88	-2.5	0.879	-2.5	0.879
	User Engagement*User-Generated Comments	-28.2	0.396	-28.2	0.395	-28.2	0.395
<i>Random Effects</i>		χ^2	p	χ^2	p	χ^2	p
	Intercept	317.80	< 0.001	234.2	< 0.001	228.0	< 0.001
	Slope	93.1	> 0.500	92.9	> 0.500	92.9	> 0.500
<i>Model Fit</i>		χ^2_{Δ}	p	χ^2_{Δ}	p	χ^2_{Δ}	p
		4.236	0.375	43.871	< 0.001	-5.839	< 0.001

Emotional Appeal

The dependent variable in Model Set 4 was emotional appeal. Emotional appeal measures how much the emotions of the participant were changed based on the content of the ad. In model 1, emotional appeal was 30.1 units greater for ads containing one or more code violations ($p = 0.004$) (Table 12). User engagement ($p = 0.929$) and user-generated comments ($p = 0.725$) were not significantly associated with emotional appeal (Model 2). None of the interaction terms between ad content, user engagement, and user-generated comments were significantly associated with emotional appeal (p 's = 0.598-0.852) (Model 3).

Emotional appeal was 63.2 units less among females compared to males ($p = 0.005$) (Table 13, Model 4). Age, race, and ethnicity were not associated with emotional appeal. Each one unit increase in AUDIT scores was associated with a 7.0 unit increase in emotional appeal ($p < 0.001$), and each one unit increase in the Facebook involvement score was associated with a 1.9 unit increase in emotional appeal ($p = 0.003$) (Model 5). Income and marital status were not significantly associated with emotional appeal. After the addition of all covariates, ad content remained significantly associated with emotional appeal ($p = 0.004$). User engagement ($p = 0.978$), user-generated comments ($p = 0.370$), and the interaction terms remained non-significant (p 's = 0.597-0.910).

In the unconditional model, the ICC equaled 0.49. Model fit significantly improved with the addition of ad content ($p = 0.021$) (Table 12). Model fit did not significantly improve when user engagement and user-generated comments ($p = 0.937$) or the interaction terms ($p = 0.961$) were included. Model fit significantly improved when age, gender, race, and ethnicity ($p = 0.032$) and AUDIT and Facebook involvement scores ($p < 0.001$) were added to the model (Table 13). Model fit did not significantly improve with the addition of income and marital status ($p = 0.317$).

Table 12. Hierarchical linear modeling results for the effects of ad content, user engagement, and user-generated comments on emotional appeal, with adjustment for covariates, model set 4, the unconditional model and models 1 through 3

Variable		Unconditional Model		Model 1		Model 2		Model 3	
<i>Fixed Effects</i>		β	p	β	p	β	p	β	p
For Intercept									
	Intercept	266.2	< 0.001	266.2	< 0.001	266.0	< 0.001	266.0	< 0.001
	User Engagement					2.1	0.929	3.4	0.882
	User-Generated Comments					8.1	0.725	8.5	0.713
	User Engagement*User-Generated Comments							-8.6	0.852
	Age								
	Gender								
	Race								
	Ethnicity								
	AUDIT								
	Facebook Involvement								
	Income								
	Marital Status								
For Ads Slope									
	Intercept			30.1	0.004	30.1	0.004	30.1	0.004
	User Engagement							9.5	0.648
	User-Generated Comments							4.6	0.825
	User Engagement*User-Generated Comments							21.9	0.598
<i>Random Effects</i>		χ^2	p	χ^2	p	χ^2	p	χ^2	p
	Intercept	577.6	< 0.001	594.7	< 0.001	593.9	< 0.001	594.7	< 0.001
	Slope			92.50	> 0.500	92.4	> 0.500	92.0	> 0.500
<i>Model Fit</i>				χ^2_{Δ}	p	χ^2_{Δ}	p	χ^2_{Δ}	p
				9.721	0.021	0.131	0.937	0.616	0.961

Table 13. Hierarchical linear modeling results for the effects of ad content, user engagement, and user-generated comments on emotional appeal, with adjustment for covariates, model set 4 continued, models 4 through 6

Variable		Model 4		Model 5		Model 6	
<i>Fixed Effects</i>		β	p	β	p	β	p
For Intercept							
	Intercept	289.2	< 0.001	277.2	< 0.001	274.5	< 0.001
	User Engagement	2.9	0.894	2.1	0.917	-0.5	0.978
	User-Generated Comments	15.0	0.501	13.2	0.510	18.2	0.370
	User Engagement*User-Generated Comments	-3.7	0.933	-5.1	0.900	-4.5	0.910
	Age	-16.4	0.114	-17.6	0.062	-18.0	0.056
	Gender	-63.2	0.005	-54.0	0.010	-59.9	0.005
	Race	18.6	0.442	34.7	0.118	36.7	0.098
	Ethnicity	9.1	0.779	26.5	0.371	22.5	0.450
	AUDIT			7.0	< 0.001	6.7	< 0.001
	Facebook Involvement			1.9	0.003	1.7	0.006
	Income					1.4	0.651
	Marital Status					48	0.154
For Ads Slope							
	Intercept	30.1	0.004	30.1	0.004	30.1	0.004
	User Engagement	9.5	0.647	9.5	0.647	9.5	0.647
	User-Generated Comments	4.6	0.825	4.6	0.825	4.6	0.825
	User Engagement*User-Generated Comments	21.9	0.597	21.9	0.597	21.9	0.597
<i>Random Effects</i>		χ^2	p	χ^2	p	χ^2	p
	Intercept	538.20	< 0.001	436.0	< 0.001	427.5	< 0.001
	Slope	91.8	> 0.500	91.7	> 0.500	91.7	> 0.500
<i>Model Fit</i>		χ^2_{Δ}	p	χ^2_{Δ}	p	χ^2_{Δ}	p
		10.573	0.032	24.216	< 0.001	2.297	0.317

Drinking Intentions

The dependent variable in Model Set 5 was future drinking intentions. Because a cumulative odds model was used to determine significant effects of the independent variables on drinking intentions, interpretation of the odds ratios are effectively reversed. For this model set, an OR greater than 1 is interpreted as more likely to have lower drinking intentions. An OR less than 1 is interpreted as less likely to have lower drinking intentions.

In model 1, ad content did not significantly increase drinking intentions (OR [95%CI] = 0.85 [0.59, 1.23]) (Table 14). High user engagement did not significant decrease drinking intentions (OR [95%CI] = 1.40 [0.76, 2.59]) and pro-drinking user-generated comments did not significantly increase drinking intentions (OR [95%CI] = 0.57 [0.31, 1.06]) (Model 2). However, the user engagement by user-generated comments interaction was statistically significant (OR [95%CI] = 0.29 [0.09, 0.99]) (Model 3). All other interaction terms were non-significant.

Females were 2.58 times more likely to have lower drinking intentions after viewing the ads compared to males (95%CI = 1.44, 4.54) (Table 15; Model 4). Age, race, and ethnicity were not significantly associated with drinking intentions. Each one unit increase in AUDIT score was associated with an 8% decrease in the odds of having decreased drinking intentions (OR [95%CI] = 0.92 [0.88, 0.97]). Each one unit increase in Facebook involvement was associated with a 3% decrease in the odds of having decreased drinking intentions (OR [95%CI] = 0.97 [0.96, 0.99]) (Model 5). Income did not significant increase drinking intentions and marital status did not significantly decrease drinking intentions (Model 6). After all covariates were added to the model, pro-drinking user-generated comments significantly decreased the odds of having lower drinking intentions by 45% (OR [95%CI] = 0.55 [0.32, 0.95]), and the user engagement by user-generated comment interaction remained significant (OR [95%CI] = 0.27 [0.09, 0.81]). User engagement

did not significantly decrease drinking intentions, and the remaining interaction terms remained non-significant. In the unconditional model, the ICC equaled 0.67.

Drinking intentions were significantly higher in all experiments groups relative to the high user engagement/anti-drinking comments group. In other words, drinking intentions were lowest in the high user engagement/anti-drinking comments group. The odds of decreased drinking intentions was 71% lower in the high user engagement/pro-drinking comments group (OR [95%CI] = 0.29 [0.13, 0.63]), 63% lower in the low user engagement/pro-drinking comments group (OR [95%CI] = 0.37 [0.17, 0.79]), and 65% lower in the low user engagement/anti-drinking comments (OR [95%CI] = 0.35 [0.16, 0.76]) group.

Table 14. Hierarchical linear modeling results for the effects of ad content, user engagement, and user-generated comments on drinking intentions, with adjustment for covariates, model set 5, the unconditional model and models 1 through 3

Variable		Unconditional Model		Model 1		Model 2		Model 3	
<i>Fixed Effects</i>		<i>OR</i>	<i>95% CI</i>	<i>OR</i>	<i>95% CI</i>	<i>OR</i>	<i>95% CI</i>	<i>OR</i>	<i>95% CI</i>
For Intercept									
	Intercept	0.04	0.03, 0.07	0.04	0.03, 0.07	0.04	0.03, 0.07	0.04	0.03, 0.07
	User Engagement					1.40	0.76, 2.59	1.47	0.80, 2.72
	User-Generated Comments					0.57	0.31, 1.06	0.54	0.30, 1.01
	User Engagement*User-Generated Comments							0.29	0.09, 0.99
	Age								
	Gender								
	Race								
	Ethnicity								
	AUDIT								
	Facebook Involvement								
	Income								
	Marital Status								
For Ads Slope									
	Intercept			0.85	0.59, 1.23	0.85	0.59, 1.23	0.86	0.59, 1.24
	User Engagement							1.09	0.52, 2.29
	User-Generated Comments							0.79	0.38, 1.66
	User Engagement*User-Generated Comments							0.63	0.14, 2.77
$\delta 1$		3.17	2.28, 4.40	3.22	2.30, 4.50	3.25	2.32, 4.56	3.27	2.33, 4.60
$\delta 2$		66.59	42.43, 104.51	69.87	44.22, 110.41	71.21	44.87, 113.03	71.89	45.18, 114.38
$\delta 3$		763.24	411.92, 1414.22	844.98	450.22, 1585.89	847.65	451.53, 1591.36	851.43	452.81, 1600.97
<i>Random Effects</i>		χ^2	<i>p</i>	χ^2	<i>p</i>	χ^2	<i>p</i>	χ^2	<i>p</i>
	Intercept	365.9	< 0.001	366.2	< 0.001	352.2	< 0.001	337.0	< 0.001
	Slope			92.3	> 0.500	97.4	> 0.500	97.3	> 0.500

Table 15. Hierarchical linear modeling results for the effects of ad content, user engagement, and user-generated comments on drinking intentions, with adjustment for covariates, model set 5 continued, models 4 through 6

Variable		Model 4		Model 5		Model 6	
<i>Fixed Effects</i>		<i>OR</i>	<i>95% CI</i>	<i>OR</i>	<i>95% CI</i>	<i>OR</i>	<i>95% CI</i>
For Intercept							
	Intercept	0.03	0.02, 0.05	0.03	0.02, 0.06	0.03	0.02, 0.06
	User Engagement	1.47	0.82, 2.64	1.52	0.88, 2.60	1.50	0.88, 2.58
	User-Generated Comments	0.51	0.29, 0.93	0.53	0.31, 0.91	0.55	0.32, 0.95
	User Engagement*User-Generated Comments	0.26	0.08, 0.83	0.28	0.09, 0.82	0.27	0.09, 0.81
	Age	1.18	0.90, 1.54	1.18	0.92, 1.52	1.16	0.91, 1.50
	Gender	2.58	1.44, 4.62	2.41	1.38, 4.21	2.29	1.29, 4.05
	Race	0.89	0.57, 1.67	0.75	0.42, 1.36	0.78	0.43, 1.41
	Ethnicity	0.95	0.41, 2.24	0.75	0.34, 1.65	0.70	0.31, 1.57
	AUDIT			0.92	0.88, 0.97	0.92	0.88, 0.97
	Facebook Involvement			0.97	0.96, 0.99	0.97	0.96, 0.99
	Income					0.98	0.90, 1.07
	Marital Status					1.39	0.56, 3.44
For Ads Slope							
	Intercept	0.86	0.59, 1.24	0.85	0.59, 1.22	0.85	0.59, 1.22
	User Engagement	1.07	0.51, 2.24	1.07	0.51, 2.22	1.07	0.52, 2.22
	User-Generated Comments	0.80	0.38, 1.67	0.80	0.38, 1.65	0.80	0.39, 1.66
	User Engagement*User-Generated Comments	0.63	0.14, 2.75	0.65	0.15, 2.79	0.65	0.15, 2.78
$\delta 1$		3.23	2.31, 4.53	3.23	2.31, 4.51	3.22	2.31, 4.50
$\delta 2$		71.93	45.18, 114.53	73.16	45.68, 117.17	73.11	45.68, 117.01
$\delta 3$		861.10	456.88, 1622.97	885.50	467.04, 1678.88	888.51	468.44, 1685.25
<i>Random Effects</i>		χ^2	<i>p</i>	χ^2	<i>p</i>	χ^2	<i>p</i>
	Intercept	304.30	< 0.001	255.4	< 0.001	254.2	< 0.001
	Slope	97.4	> 0.500	98.0	> 0.500	98.0	> 0.500

Individual User Engagement

In Model 6, individual user engagement was defined as when a participant Agrees or Strongly Agrees they would Like or Share the ad being displayed. In all, 44% of participants indicated they would Like or Share at least one of the viewed Facebook ads. In model 1, ad content did not significantly increase the odds of individual user engagement (OR [95%CI] = 1.47 [0.91, 2.38] (Table 16). Similarly, user engagement values (OR [95%CI] = 1.19 [0.58, 2.43]) and user-generated comments (OR [95%CI] = 1.87 [0.91, 3.84]) did not significantly increase the odds of individual user engagement (Model 2). The interactions between ad content, user engagement values, and user-generated comments were also non-significant (Model 3)

Age, race, and ethnicity did not significantly increase the odds of individual user engagement and gender did not significantly decrease the odds of individual use engagement (Model 4) (Table 17). Each one unit increase in AUDIT scores significantly increased the odds of individual user engagement by 8% (OR [95%CI] = 1.08 [1.02, 1.15]) (Model 5). Similarly, each one unit increase in the Facebook Involvement score significantly increased the odds of individual user engagement by 4% (OR [95%CI] = 1.04 [1.02, 1.07]). Income did not significantly decrease the odds, and marital status did not significantly increase the odds, of individual user engagement (Model 6). After introducing all covariates, participants exposed to pro-drinking user-generated comments were 2.3 times more likely to Like or Share the alcohol ad being displayed (95%CI = 1.09, 4.85). In the unconditional model, the ICC equaled 0.66.

Table 16. Hierarchical linear modeling results for the effects of ad content, user engagement, and user-generated comments on individual user engagement, with adjustment for covariates, model set 6, the unconditional model and models 1 through 3

Variable		Unconditional Model		Model 1		Model 2		Model 3	
<i>Fixed Effects</i>		<i>OR</i>	<i>95% CI</i>	<i>OR</i>	<i>95% CI</i>	<i>OR</i>	<i>95% CI</i>	<i>OR</i>	<i>95% CI</i>
For Intercept									
	Intercept	0.25	0.18, 0.36	0.25	0.17, 0.36	0.24	0.17, 0.35	0.24	0.17, 0.35
	User Engagement					1.19	0.58, 2.43	1.23	0.59, 2.56
	User-Generated Comments					1.87	0.91, 3.84	1.86	0.90, 3.87
	User Engagement*User-Generated Comments							0.60	0.14, 2.59
	Age								
	Gender								
	Race								
	Ethnicity								
	AUDIT								
	Facebook Involvement								
	Income								
	Marital Status								
For Ads Slope									
	Intercept			1.47	0.91, 2.38	1.47	0.91, 2.39	1.47	0.89, 2.41
	User Engagement							0.96	0.35, 2.58
	User-Generated Comments							1.08	0.40, 2.93
	User Engagement*User-Generated Comments							1.42	0.19, 10.38
<i>Random Effects</i>		χ^2	<i>p</i>	χ^2	<i>p</i>	χ^2	<i>p</i>	χ^2	<i>p</i>
	Intercept	258.7	< 0.001	257.0	< 0.001	251.5	< 0.001	250.7	< 0.001
	Slope			53.6	> 0.500	53.8	> 0.500	53.7	> 0.500

Table 17. Hierarchical linear modeling results for the effects of ad content, user engagement, and user-generated comments on individual user engagement, with adjustment for covariates, model set 6 continued, models 4 through 6

Variable	Model 4		Model 5		Model 6	
<i>Fixed Effects</i>	<i>OR</i>	<i>95% CI</i>	<i>OR</i>	<i>95% CI</i>	<i>OR</i>	<i>95% CI</i>
For Intercept						
Intercept	0.24	0.14, 0.44	0.19	0.11, 0.35	0.18	0.10, 0.34
User Engagement	1.20	0.57, 2.51	1.09	0.53, 2.26	1.05	0.50, 2.18
User-Generated Comments	1.93	0.92, 4.06	1.97	0.95, 4.07	2.30	1.09, 4.85
User Engagement*User-Generated Comments	0.57	0.13, 2.51	0.53	0.12, 2.30	0.55	0.13, 2.36
Age	1.09	0.78, 1.53	1.07	0.77, 1.49	1.02	0.73, 1.43
Gender	0.75	0.36, 1.53	0.77	0.37, 1.59	0.62	0.29, 1.32
Race	1.22	0.56, 2.67	1.55	0.70, 3.43	1.80	0.81, 4.04
Ethnicity	1.40	0.50, 3.93	2.00	0.73, 5.48	1.65	0.59, 4.57
AUDIT			1.08	1.02, 1.15	1.08	1.02, 1.14
Facebook Involvement			1.04	1.02, 1.07	1.04	1.02, 1.07
Income					0.92	0.81, 1.03
Marital Status					2.45	0.82, 7.31
For Ads Slope						
Intercept	1.50	0.91, 2.48	1.45	0.87, 2.40	1.45	0.87, 2.40
User Engagement	0.96	0.35, 2.61	0.96	0.35, 2.64	0.96	0.35, 2.66
User-Generated Comments	1.08	0.40, 2.94	1.11	0.41, 3.06	1.11	0.40, 3.07
User Engagement*User-Generated Comments	1.44	0.19, 10.74	1.46	0.19, 11.06	1.46	0.19, 11.17
Random Effects						
	χ^2	<i>p</i>	χ^2	<i>p</i>	χ^2	<i>p</i>
Intercept	249.0	< 0.001	215.4	< 0.001	208.2	< 0.001
Slope	53.7	> 0.500	54.4	> 0.500	55.0	> 0.500

Experimental Credibility

When asked what the purpose of the study was, 14 (12%) participants indicated that the study was designed to determine the influence of user-generated comments, and 5 (4%) indicated that the effect of different Facebook ads was being studied. No participants indicated that the study purpose involved the possible effects of different user engagement values. In all, 66.6% of participants strongly disagreed, disagreed, or neither agreed nor disagreed with the statement that the Facebook ads viewed in the study were manipulated in some way. When asked about their level of agreement to that statement that the number of Likes, Shares, and Comments associated with the Facebook ads were about what would be expected, 82.5% of participants responded with neither agree nor disagree, agree, or strongly agree. When asked about their level of agreement to that statement that the user-generated comments associated with the Facebook ads were about what would be expected, 69.9% of participants responded with neither agree nor disagree, agree, or strongly agree.

Summary of Study 2 Results

In Study 2, Facebook alcohol ads that contained one or more violations of a self-regulated alcohol advertising code were perceived as significantly more emotionally appealing while source and informational appeal was significantly lower. Drinking intentions and the odds a participant would engage with an ad through the Like or Share function were significantly greater among participants who viewed pro-drinking user generated comments.

DISCUSSION

The results of the two studies conducted support the following four conclusions: 1) Self-regulation of alcohol advertising has failed to effectively restrict the content of the Facebook ads published by Budweiser and Bud Light and evaluated in Study 1. The code violation rate was 82%, and there was a high prevalence of content that is likely to appeal to young men. 2) The Individual Criterion is a more accurate method of determining code compliance than the Average Criterion. 3) Appeal of alcohol ads published on Facebook is primarily determined by ad content. Ads compliant with IARD's Guiding Principles scored significantly higher on source and information appeal. Ads non-compliant with IARD's Guiding Principles scored significantly higher on emotional appeal. This suggests that the failure of self-regulation to protect vulnerable populations is due to inadequate code implementation and enforcement. 4) Pro-drinking user-generated comments can increase drinking intentions and the odds of an individual Liking or Sharing an ad. Given that positive comments towards drinking, the product or the ad, are twice as prevalent as negative comments, Facebook users are more likely to encounter pro-drinking user-generated comments when viewing an alcohol ad on Facebook. Each conclusion will be elaborated on further throughout the remainder of the Discussion. Secondary study findings, study implications, the strengths and limitations of the current study, and future research will also be discussed.

The study findings do not support our hypotheses regarding ad appeal because neither ad content, user engagement, nor user-generated comments were significantly associated with total ad appeal. However, these hypotheses suffered from a lack of specificity regarding the type of appeal (i.e. source, informational, emotional) being ascertained and the mistaken assumption that each type of appeal would be positively correlated. The findings support the hypotheses that pro-

drinking user-generated comments are more likely to cause someone like the participant to want to drink and Like or Share the ad. The findings do not support the hypotheses stating that non-compliant advertising and high user engagement values are more likely to cause someone like the participant to want to drink and Like or Share the ad.

Ineffectiveness of Self-Regulation

This is the first study to systematically evaluate alcohol advertising on a SNS for compliance with a self-regulated alcohol advertising code. The results strongly suggest that the current system of self-regulation has failed to control the content of the Bud Light and Budweiser ads included in this study. The violation rate among the ads was 82%, and the lack of a significant correlation between violation status and total user engagement suggests that approximately 80% of all Bud Light and Budweiser ads published on Facebook during the study period contained one or more violations. This violation rate is consistent with the violation rate of 74% reported for websites maintained by beer brands from the U.K. (Gordon 2011). The violation rate is also consistent with recently reported violation rates of alcohol ads published on television (Babor et al. 2013; Noel et al. 2017).

This is the first study to determine thematic content in alcohol advertising published on Facebook, and the results identified a high prevalence of content that may be attractive to young men, including adventure/sensation seeking, sports, and partying. While this study did not determine if each content area specifically appealed to men, AB InBev representatives have stated that the company uses SNSs to specifically target 21 to 34 year old men (Dupre 2013), thereby increasingly the likelihood that the most prevalent content in the ads is likely aimed at this demographic. Moreover, findings from the factorial experiment (Study 2), which showed that total ad appeal was significantly greater among men compared to women, also suggests the thematic

content within the ads was meant to target men. Importantly, recall of advertisements that contain a party theme was predictive of overall alcohol consumption and binge drinking in a sample of U.S. teens (Morgenstern et al. 2016).

The ineffectiveness of self-regulation of alcohol advertising is also demonstrated by the consistent use of the same themes in ads published before and after the introduction of self-regulation in the late 1990's. Although the contexts have likely changed through the years, the general content areas documented in this study have been documented in alcohol advertising since the 1980s. Early evaluations of alcohol advertising in the U.S. concluded that physical activity and hazardous risk-taking behavior were among the most prevalent content areas (Finn and Strickland 1982). U.S. alcohol advertising in the late 1990s and early 2000s contained a high prevalence of masculinity (Austin and Hust 2005), and masculinity and sensation seeking were among the seven most prevalent thematic content areas in an evaluation of alcohol ads broadcast during the U.S. National Collegiate Athletic Association's men's and women's basketball tournaments (Noel, Xuan, and Babor 2017). Similar content has been documented in Australian and Brazilian alcohol advertising (Pettigrew et al. 2012; Pinsky and Silva 1999). In Italy, alcohol advertising has attempted to move alcohol use away from traditional settings (Beccaria 2001).

The content analysis also suggests that the alcohol industry's Digital Guiding Principles, which are specific to digital advertising media and include SNSs, are ineffective. Specifically, guidelines stating that responsibility messages be included and that content should not be forwarded to individuals under the MLPA were likely violated (International Alliance for Responsible Drinking 2014). Only 20% of the ads contained an industry responsibility message, and neither rater identified any information in the ads that instructs viewers not to forward content to individuals under the MLPA. It is likely that this information exists somewhere on the Bud Light and

Budweiser Facebook pages; however, it is also unlikely a viewer of a Bud Light or Budweiser ad will see this information. These ads appear in the Newsfeeds of individual Facebook users, particularly if a Facebook friend Likes or Shares the ad, and these Facebook users are unlikely to search for a branded Facebook page to seek out this type of information.

Emotion in Advertising

Facebook ads that were non-compliant with IARD's Guiding Principles were rated significantly higher on emotional appeal, and significantly lower on informational and source appeal, compared to compliant ads. Given the role of emotion in memory, this finding suggests that non-compliant alcohol ads are more likely to be remembered than compliant ads. For example, one study demonstrated that emotional music was better remembered than neutral music (Eschrich, Münte, and Altenmüller 2008), and another study concluded that emotional stimuli improve true memory compared to neutral stimuli, even when the stimuli contain near identical thematic elements (Choi, Kensinger, and Rajaram 2013).

Memory for emotional alcohol advertising is likely to be enhanced due to increased attention paid towards the ad (Talmi and McGarry 2012). Emotion can increase the attention paid towards a cue, and more neural processes are used when encoding an emotional cue into memory (Cona, Kliegel, and Bisiacchi 2015). The additional neural resources devoted to emotional cues results in preferential memory encoding for emotional information compared to neutral information (Yick, Buratto, and Schaefer 2016). Emotional cues also increase the competition between mental representations of an event, causing greater attention to be paid towards foreground objects at the expense of background information (Ponzio and Mara 2014).

Emotional alcohol ads are more likely to be stored in long-term memory. A generic stimulus associated with an emotional response is more likely to be encoded in long-term memory than an

unpaired stimulus (Riggs et al. 2010), and this effect may be independent of task knowledge and the context where the learning took place (Steidl, Razik, and Anderson 2011). Memory encoding of emotional information requires significantly less overt attention paid to the stimulus, and such information is better remembered, even after very brief exposures (Kim, Vossel, and Gamer 2013). Moreover, emotional memories are more accurate than neutral memories (Kensinger et al. 2016; Chipchase and Chapman 2013). Interestingly, one study demonstrated that emotionally encoded stimuli were not retained after administration of alcohol (Brown et al. 2010), and another study showed that individuals in a hunger state recalled food images at a greater rate than clothing images, which was not seen in sated individuals (Talmi et al. 2013). This suggests that the effect of emotion in alcohol ads may be greatest among lifetime abstainers or among current drinkers prior to drinking occasions.

Emotional advertising is more likely to be recalled than non-emotional advertising. In a study using spoken stories, greater recall existed for emotional stories than for neutral stories, with emotional stories eliciting greater perceptual memory, which is the ability to interpret stimuli by recognizing individuals and relationships between individuals (Arntz, de Groot, and Kindt 2005). Emotionally arousing pictures were recalled at a higher rate than neutral pictures in a rapid serial visual presentation study (Versace, Bradlet, and Lang 2010), and in a study of spontaneous memory retrieval, emotional pictures were recalled at a higher rate than neutral pictures (Weymar et al. 2013). Interestingly, emotional words can also be recalled at a higher rate than neutral words. Within the context of the classic Stroop test, the color of emotional words had a higher rate of recall than neutral words (Mackay et al. 2004), and word lists with emotional words were immediately recalled at a higher rate than control word lists (Hadley and MacKay 2006). Emotional advertising has similar effects, and emotional ad content has been demonstrated to boost

ad recall rates (Mehta and Purvis 2006). Intriguingly, emotion arousing print advertising was retained at a higher rate among females than males (Baird, Wahlers, and Cooper 2007). The effect of emotion on memory recall may be particularly strong for alcohol because the effect of repetition on memory was greatest among emotionally paired stimuli (Ferrari et al. 2013) and individuals are repeatedly exposed to alcohol ads (Noel, Babor, and Robaina 2017).

The mechanism between emotion and memory in advertising may be entertainment. Entertaining ads are perceived as having greater value to the individual (Wook Ha, Park, and Lee 2014; Saxena and Khanna 2013; Tan, Kwek, and Li 2013; Lee and Hong 2016; Dehghani et al. 2016). For example, a study of 315 college students concluded that perceived entertainment value of an ad significantly increased positive ad attitudes (Dehghani et al. 2016), and entertaining ads may be four times more powerful at influencing attitudes than purely informational advertising (Taylor, Lewin, and Strutton 2011).

In addition to remembering, emotional advertising is likely to be more difficult to forget. Emotional words are relatively resistant to directed forgetting (Bailey and Chapman 2012), and emotional events are more difficult to intentionally forget than mundane or neutral events (Payne and Corrigan 2007). Similar to other aspects of memory, positive memories are less likely to be forgotten, which results in unpleasant memories associated with alcohol use fading quicker than pleasant memories (Gibbons et al. 2013).

Evidence suggests that positive stimuli elicit a stronger cognitive response than negative emotional stimuli, which is concerning from a public health perspective because the thematic content found in alcohol ads evaluated here and elsewhere is generally positive (Noel, Babor, and Robaina 2017). Positive stimuli produce a stronger response during the coding process (Chainay et al. 2012), and positive emotional content is known to enhance memory among older adults

(Kensinger, Garoff-Eaton, and Schacter 2007). Distractor tasks decrease memory for negative stimuli at a greater rate than positive stimuli (Libkuman, Stabler, and Otani 2004), and positive stimuli are more easily retained when attention is not focused on the emotional stimulus (Ferré 2003).

Positive thematic content in alcohol advertising likely has a similar effect on ad recall. Although all emotional past-events may be recalled at a higher rate than neutral events (Toyota 2011), a bias towards positive memories has been demonstrated during controlled memory retrieval studies (Everaert and Koster 2015). In a study using movie clips, positive clips elicited maximum functioning of the cognitive system throughout the exposure period whereas maximum functioning when viewing negative clips peaked after ten seconds (Yegiyan 2015). Emotional items are also more likely to be encoded in congruent situations, with positive words better encoded during positive situations and negative words better encoded during negative situations (Ferré et al. 2015), suggesting that excessive alcohol consumption or success attributable to the alcoholic beverage may be subconsciously reinforced by positive depictions of alcohol use in alcohol advertising.

Retention and recall of neutral information presented before or after an emotional alcohol ad is more likely to be suppressed, which may influence the effectiveness of health promotion information presented alongside an ad. Stimuli occurring after an emotional stimulus has occurred are less likely to be remembered due to competing pathways during the memory encoding process (Knight and Mather 2009). Moreover, memory recall of information presented immediately before or after the emotion is suppressed (Kensinger, Garoff-Eaton, and Schacter 2007). In studies of word lists, immediate recall of neutral words was suppressed if surrounded by emotional words (Hadley and MacKay 2006), with similar results occurring during a Stroop test (Mackay et al.

2004). Others have shown that recall of neutral pictures was reduced when interspersed with emotional items (Watts et al. 2014). The effect has been observed for advertising as well. For example, emotional responses to Super Bowl XX was inversely associated with recall of ads broadcast during the event (Pavelchak, Antil, and Munch 1988). These effects occur because increased attention is paid to the emotional stimuli at the cognitive level, and the efficiency at which items immediately before and after the emotional stimulus are remembered is significantly reduced (Schmidt and Schmidt 2016).

Because of the potential effects emotional alcohol ads may have on surrounding information, any effects of industry or public health messaging may be significantly reduced. Industry responsible drinking messages (e.g. “live responsibly”) principally occur at the end of advertisements, after the emotional reaction caused by the ad, and few cognitive processes may be available to effectively encode the information. If sufficient resources are available, public health practitioners may want to broadcast anti-alcohol messages immediately before or after an alcohol ad; however, unless emotionally stimulating on its own, these messages may not be effectively encoded into the long-term memory of targeted individuals.

Increased Drinking Intentions and Alcohol Consumption

Pro-drinking user generated comments were associated with increased drinking intentions at high user engagement levels, which may indicate that pro-drinking user generated comments can increase actual alcohol consumption. Several studies have demonstrated that drinking intentions are associated with alcohol consumption in young adults. Drinking intentions explained 12% of the variability in a study of short-term drinking behavior (Conner et al. 1999), and in a study of 120 undergraduate binge drinkers, intention to drink was the only significant predictor of alcohol consumption (Elliott and Ainsworth 2012). Binge drinking intention significantly predicted binge

drinking at a one-week follow-up (Norman, Armitage, and Quigley 2007) and may explain up to 35% of the variance in actual binge drinking (Norman 2011). Other studies provide further support for the association between drinking intentions and heavy episodic drinking (Collins and Carey 2007; Cooke, Sniehotta, and Schuz 2007).

If pro-drinking user-generated comments increase drinking intentions, there may be long-term consequences. In a study of undergraduate students, drinking intentions at baseline were associated with drinking behavior at a six month follow-up (McMillan and Conner 2003), and among a community sample of high school women, pre-college drinking intentions indirectly predicted heavy episodic drinking during the first semester of college (McMillan and Conner 2003). Moreover, there is some evidence that pro-drinking user-generated comments may increase negative consequences of alcohol use. In a study of U.S. and Swedish college students, each 1 unit increase in drinking intentions, which was measured using a composite scale, was associated with a 6% increase in negative alcohol-related consequences (Grazioli et al. 2015).

Message Diffusion on SNSs

There is some evidence that the number of individuals exposed to a message on an SNS increases exponentially, depending on the message. In only two generations, a single message published by an electronic cigarette company on Twitter reached approximately 2,700 Twitter users organically, or without paid advertising (Chu et al. 2015). However, SNS messages typically have short lifespans. Most posts on the Chinese microblogging site Weibo, which is similar to Twitter, are either not shared by message recipients or are only shared through one generation (Liu et al. 2016). The message does not diffuse past the followers of the followers of the original message creator. Similarly, 50% of advertising messages on Weibo reach fewer than two generations of users (Zhang and Peng 2015).

The possible consequence of pro-drinking user-generated comments associated with an alcohol ad on Facebook is a longer life for the ad and greater exposure to the ad among Facebook users than would have occurred in the absence of such comments. Greater exposure of non-compliant advertising, which represents the majority of the sample evaluated here, may result in increased retention of the ad, and since user-generated comments are shared along with the ad, increased drinking intentions among an ever larger subset of Facebook users.

Intent to Like or Share a Facebook ad is also a direct predictor of the future drinking intentions of the individual who Liked or Shared the ad (Lee and Hong 2016; Alhabash et al. 2015). Brand identification and brand trust are higher among those who retweet brand messages on Twitter (Kim, Sung, and Kang 2014), and those with positive attitudes towards a brand are more likely to share a SNS brand message (Chu and Sung 2015). Although not directly measured here, eWOM intention and purchase intention have both been significantly associated with message engagement for SNS brand pages (Hutter et al. 2013) and anti-obesity public service announcements (Phua and Tinkham 2016).

The process of Liking or Sharing a Facebook ad may make the ad more effective and memorable. Shared Facebook ads, when viewed by other Facebook users, are also more likely to be perceived as credible and less intrusive compared to direct brand communications (Morris, Choi, and Ju 2016). Shared ads may also elicit strong positive emotions, which, as described above, will enhance memory retention and recall.

User-Generated Comments as Word of Mouth

Compared to anti-drinking comments, pro-drinking user-generated comments significantly increased intentions to drink among study participants and the odds a participant would Like or Share an alcohol ad, both of which are predictors of future alcohol use. The likely explanation for

this effect is that user-generated comments serve as a form of electronic word-of-mouth (eWOM). Essentially, user-generated comments act as an alternate source of information that can reinforce or negate the message conveyed in the ad (Kim and Sun 2006). In a traditional setting, word-of-mouth (WOM) functions as a product or service recommendation and referral, and although WOM is more influential than eWOM, eWOM can significantly increase product purchases (Meuter, Brown McCabe, and Curran 2013). For instance, customer incentives to refer new customers resulted in a twelve-fold return on investment (Kumas, Petersen, and Leone 2007). The primary difference between WOM and eWOM is the method at which the information is related. While WOM primarily consists of verbal communications, eWOM is primarily written information published on a digital platform, such as the user-generated comments used here. Theoretically, eWOM can directly and indirectly, through consumer product trust, influence purchase decisions (See-To and Ho 2014).

The effect of pro-drinking and anti-drinking user-generated comments found here followed a predictable pathway. Some studies have determined that positive eWOM significantly improves purchase intentions while negative eWOM significantly decreases purchase intentions (Sandes and Urdan 2013; Wu 2013). Others have demonstrated differential effects of positive and negative eWOM. One study concluded that negative eWOM significantly decreased consumer attitudes and purchase probability while positive eWOM had no effect (Podnar and Javernik 2012), while another study found that negative eWOM significantly reduced brand equity and purchase intentions, particularly for high involvement products such as a car (Beneke et al. 2016). Negative eWOM may also impact purchase decisions only when multiple eWOM messages conveying the same information are displayed concurrently (Lee and Cranage 2014; Kim and Gupta 2012). In contrast, single negative eWOM messages tend to decrease the overall value of the message and,

counterintuitively, make individual product evaluations less negative (Kim and Gupta 2012). Others have demonstrated that positive eWOM can significantly increase purchase intentions (Lim 2015).

The effectiveness of the user-generated comments used in the study may have been aided by the decision to use comments generated by other Facebook users rather than standardized public health messages. Real user-generated comments were likely perceived as more credible and trustworthy, both of which are important to eWOM effectiveness. Trustworthy eWOM messages can significantly influence purchase intentions in the anticipated direction (e.g. positive eWOM messages increase purchase intentions) while untrustworthy messages may result in inverse relationships (Reimer and Benkenstein 2016). Credibility is also a function of repetition, with eWOM messages perceived as more credible if they are consistent with other eWOM messages, timeliness, and comprehensiveness of the information (Chang and Wu 2014; Cheung 2014; Elwalda, Lü, and Ali 2016).

eWOM message credibility is also influenced by an individual's social network, which may explain why there was a consistent positive association between Facebook involvement and the dependent variables. A sense of virtual community reinforces that messages within eWOM communications (Huang, Hsiao, and Chen 2012), and connection strength within the network significantly influences eWOM spread (Wang et al. 2016). Individuals with dense social structures may also be more apt to rely on eWOM recommendations (Sohn 2009). Moreover, among female SNS users, perceived eWOM quality was greatest when the participants exhibited greater trust in others on the SNS and felt a greater sense of belonging to the SNS community (Choi and Scott 2013).

If user-generated comments function as eWOM and pro-drinking comments can increase drinking intentions, it is expected that exposure to such comments among typical Facebook users would result in increased drinking behavior because, although the literature is not definitive, there is a consistent association between intentions to drink and drinking behavior. Other studies have demonstrated that SNS users drink while using a SNS platform (Barnes et al. 2016; Whitehill, Pumper, and Moreno 2015) and that posting drinking images on SNSs is associated with increased alcohol consumption (D'Angelo, Kerr, and Moreno 2014; Moreno et al. 2012; Moreno et al. 2015). However, since ad content was not a significant predictor of drinking intentions in this study, the response of other SNS users may be the underlying mechanism of the previous associations between SNS use and alcohol consumption. User-generated comments supportive of alcohol use may reinforce any pro-alcohol depictions of a SNS post or ad while comments unsupportive of alcohol use may diminish this effect. In either scenario, any exposure to alcohol use on an SNS may have an impact, but the comments associated with that exposure may determine changes in health behavior.

With pro-drinking user-generated comments more prevalent than anti-drinking comments by a two to one margin, a Facebook user who saw the alcohol ads used in these studies was much more likely to be exposed to the reinforcing effects of pro-drinking comments. Moreover, because such comments may increase ad exposure and indirectly increase alcohol consumption, the alcohol producers have little incentive to regulate user-generated comments written in response to their advertising despite pledges to do so. In actuality, the brands evaluated here may be encouraging such responses. The third most prevalent comment analyzed was the brand writing a message in response to a comment from a Facebook user. Although a formal content analysis was not performed, there are indications that these messages are antithetical to public health interests. This

includes two company responses urging abstainers to consume alcohol and several responses containing images of alcohol use in party atmospheres.

The Role of Weak Social Ties

The effect of user-generated comments on drinking intentions and individual user engagement may have occurred due to the presence of weak social ties. Every social network consists of strong and weak ties (Granovetter 1973). Strong ties are typically found with individuals who one interacts with regularly, such as close friends and family members. Weak ties are with individuals who one interacts with irregularly. These individuals exist outside of one's typically social network and often come from different groups that have different belief structures. According to Granovetter's Strength of Weak Ties theory (1973), weak ties are much more likely to deliver new information into a social network, and these weak ties enhance diffusion of information across a population (Granovetter 1983; Granovetter 1973). Conversely, destruction of a weak tie interrupts transmission of that behavior to a greater extent than destruction of a strong tie (Onnela et al. 2007; Cheng et al. 2013).

SNSs encourage the formation of weak ties by providing unconnected individuals the opportunity to interact with the same SNS post (Ellison, Steinfield, and Lampe 2011; Dible and Sumner 2016). Prior to this interaction, SNS users are connected through latent ties, which are weak ties that technically exist but have not been activated through an interaction (Haythornthwaite 2002; Haythornthwaite 2005). Here, participation in the study may have activated latent network ties and caused the formation of weak social ties between the study participant and the authors of the user-generated comments, even if only briefly. Prior to the study, it is highly unlikely that study participants were aware of the comments as written, because few

comments are automatically displayed by Facebook and the amount of time that had passed between the publishing of the ad and the study, or knew the authors of the comments.

The significant effects found in this study are consistent with previous research on the influence of weak ties. Weak ties can reinforce and provide social support for a behavior, which pro and anti-drinking comments appeared to do in this study. Social support drawn from weak ties has a similar effect as social support drawn from strong ties (Rozzell et al. 2014), and weak ties act as a bridge between the need to control oneself and the need for external support (Rogers et al. 2014). Multiple weak tie connections between two groups also reinforce information transfer (Centola and Macy 2007). Specific to alcohol consumption, weak ties created through romantic relationships can enhance the spread of alcohol consumption (Kreager and Haynie 2011), and weak ties may be more effective than strong ties at conveying normative messages, although the reverse may be true for educational messages (Lu 2013). Weak ties are also important in maintaining cooperation in the classic prisoner's dilemma game, whereby cooperation between two individuals is mutually beneficial but non-cooperation can be mutually detrimental (Xu, Liu, and You 2011). Moreover, the effects of weak ties are strongest among those with the highest levels of community engagement and those with greater social engagement through digital media (Kavanaugh et al. 2005).

As Granovetter's theory (1973; 1983) implies, weak ties promote information diffusion through SNSs, which was demonstrated in Study 2 where pro-drinking user-generated comments significantly increased the odds that a participant would Like or Share an alcohol ad. Positive weak ties may have a greater effect on information propagation than strong ties (Zhao et al. 2012), suggesting that pro-drinking comments may be increasing individual user engagement rather than anti-drinking comments suppressing such behavior. The effect is also greatest when more

perceived weak ties are in an SNS audience (Kim, Lee, and Elias 2015), which may explain why no main effect of user engagement values was seen. Although participants were asked whether they would Like or Share the Facebook ad presented to them, no actual sharing of the information would have occurred and the number of perceived weak ties in the audience was effectively zero.

Secondary Findings

There are three secondary findings in the study worth further discussion. First, AUDIT scores were positively associated with ad appeal (total appeal, source appeal, informational appeal, and emotional appeal), drinking intentions, and individual use engagement. These findings may reflect a predilection among heavy alcohol users towards a stronger psychological response to any alcohol advertising regardless of ad content or surrounding information. This result would be consistent with the results of cue exposure studies that concluded heavy alcohol users may be more sensitive to alcohol-related cues (Kim et al. 2014), report high levels of craving after exposure to alcohol cues (Bordnick et al. 2008; Lee et al. 2008; Reid et al. 2006), and report increases in craving even in the absence of direct alcohol cues (Mason et al. 2008). Future secondary analyses of study data could include identifying potential moderating or mediating effects of AUDIT scores between the experimental conditions and the outcome measures.

Second, Facebook involvement scores were positively associated with ad appeal (total appeal, source appeal, informational appeal, and emotional appeal), drinking intentions, and individual use engagement, and these associations were approximately one-half the magnitude of AUDIT scores. This general finding is consistent with research demonstrating that individuals who actively engage with a SNS are more likely to have favorable attitudes towards SNS advertising (Akar and Topçu 2011; Celebi 2015; Chi 2011). The finding is also consistent with electronic word of mouth studies that have demonstrated that increased engagement with a platform is

associated with increased influence of eWOM on purchase intentions (Choi and Scott 2013; Huang, Hsiao, and Chen 2012; Sohn 2009). Intensity of Facebook use has also been shown to mediate the relationship between the number of Likes a Facebook brand page has and purchase intentions (Phua and Ahn 2016). While previous studies have focused on the trustworthiness of user-generated content, the findings presented here may represent a greater general trustworthiness of information presented on SNSs that results from greater SNS use. Similar to AUDIT scores, future secondary analysis should explore potential mediating or moderating roles for Facebook involvement as it relates to drinking intentions and individual user engagement after exposure to alcohol advertising.

Third, gender was significantly associated with total ad appeal, informational appeal, emotional appeal, and drinking intentions. Females perceived the ads to be less appealing, to contain less informational appeal, and to be less emotionally appealing. Drinking intentions were also significantly lower among females after viewing the ads. These findings are consistent with statements made by A-B InBev marketing executives that digital advertising is targeted at young men, and not young women (Dupre 2013), and provides an indication that the positive effects of pro-drinking user-engagement comments cannot increase the effectiveness of an alcohol ad if the ad reaches the wrong audience. The findings do not indicate that females cannot be affected by SNSs or SNS advertising as no significant differences in source appeal or individual user engagement between genders were noted. Other alcohol brands may specifically target women (Mart and Giesbrecht 2015), and when that occurs, the direction of the significant gender associations seen here may be reversed.

Implications

The results of the studies described here could have significant policy, program, and theoretical implications. Regarding policy, the evaluation of alcohol ads published by Budweiser and Bud Light on Facebook indicate that self-regulation of alcohol advertising has failed to prevent content that may be harmful to vulnerable populations and has failed to prevent other thematic content that may specifically appeal to young men. These findings are consistent with numerous other studies conducted in multiple media types demonstrating a high prevalence of alcohol advertising code violations (Noel, Babor, and Robaina 2017), although discovering non-compliance in alcohol advertising should not be surprising. Examination of IARD's Guiding Principles, which was used as the reference advertising code in this study, reveals a lack of information on how to implement the code prior to ad production. Moreover, no real or potential penalties are discussed when the code is violated.

Routine violation of a self-regulated advertising code by the alcohol industry indicates an unwillingness to restrict their advertising content for public health purposes and invites regulators to pass government restrictions on such activities, which may be necessary to sufficiently deter alcohol producers from repeatedly violating a marketing code. Ideally, any improved alcohol advertising code would utilize a permissive content structure, contain specific language on how to implement the advertising code prior to publication, and detail real-world penalties for code violations. A permissive content structure would specify the types of content that are allowed in alcohol advertising, rather than define what content is not allowed, which is how current self-regulated alcohol marketing codes are currently written.

Permissible content should be similar to France's Loi Evin (1991) and should only include the name of the alcohol producer, the name of the brand, and the characteristics of the product. If the

current restrictive codes are simply expanded, the list of banned content areas could eventually become too cumbersome to properly enforce. Implementation of the code prior to publication is necessary to ensure non-compliant ads are prevented from being seen by vulnerable populations. Under a preclearance system, alcohol ads would be reviewed for compliance with the existing alcohol advertising code by public health professionals, members of vulnerable populations, and other individuals who have sufficient expertise to protect vulnerable populations prior to public distribution. Due to lack of expertise and potential conflict of interest issues, representatives from the alcohol and marketing industries should not participate in the review process. If ads are deemed non-compliant, the ad producer has the opportunity to re-design the ad. If the ad is deemed non-compliant but is still published, strict penalties, from monetary fines to complete advertising bans, should be instituted.

Interestingly, the failure of alcohol advertising self-regulation to protect vulnerable populations may not be due to the guidelines themselves. As demonstrated here, ads that are compliant with the spirit of the codes were rated significantly lower on emotional appeal and significantly higher on source and informational appeal, which is ideal from a public health perspective. Instead, the lack of proper implementation guidelines and deterrents for non-compliance may account for the failure of self-regulation. Currently, the worst penalty applied to an alcohol producer for a non-compliant ad is removal of the ad from the marketplace, although this typically only occurs long after the ad has been viewed by the public (Noel and Babor 2017).

Additional legislative restrictions specific to alcohol advertising on SNSs may be needed. The content restrictions of current self-regulated alcohol advertising codes typically apply only to the ad itself, but the study has demonstrated that user-generated comments associated with an alcohol ad can have significant negative health impacts. Moreover, other studies have demonstrated that

user engagement values, in the absence of user-generated comments, can significantly influence perceptions of the ad (Koroleva et al. 2011; Paek, Hove, and Jeon 2013; Phua and Ahn 2014; Alhabash et al. 2015). Therefore, regulations on SNS alcohol advertising should also include severe restrictions or bans on commenting and engaging with the ad. A similar regulatory scheme has been implemented in Finland where recent amendments to the Finnish alcohol control law have effectively banned advertising on SNS due to restrictions on the creation of content meant to be shared and distributed within social networks (YLE 2014).

Programmatically, the influence of user-generated comments on drinking intentions and individual user engagement may be used to devise novel methods of health promotion. Currently, health promotion campaigns that incorporate SNSs publish health information through the typical posting process. For example, an image and associated tagline is created and posted on an organization's Facebook page. The Facebook post is primarily viewed by individuals who already follow the organization's Facebook page, even if resources are available to promote the post among individuals who are not currently engaged with the organization. Although the content generated for SNS health promotion campaigns is generally effective, the population reach is typically small due to low numbers of page followers and too little resources to promote the page amongst the target population (Laranjo et al. 2015).

The results presented here provide an alternative method for distributing health promotion messages through SNSs. Instead of creating a separate Facebook page, health information can be posted as a user-generated comment underneath a post promoting an unhealthy behavior. For alcohol use, health information can be posted as a comment underneath each Facebook ad published by alcohol producers. If health information is delivered within this format, the message will be distributed to all Facebook users who view the alcohol ad, which can exceed 100,000

individuals per ad. Thus, alcohol producers would be burdened with shouldering the message distribution costs of anti-drinking health information, and campaign resources are only spent producing and posting the message. A secondary benefit of posting an anti-drinking message immediately below an alcohol ad is the potential to significantly disrupt the impact of the ad itself. If the results of this study are confirmed, anti-drinking user-generated comments may significantly reduce drinking intentions caused by the ad and limit message diffusion of the ad through a SNS.

On a theoretical level, it appears that no single theory can accurately describe how health-related messages on an SNS are transmitted through social networks and influence behavior intentions. Because user-generated comments increased drinking intentions and message diffusion, they may fit neatly into Social Contagion Theory, which treats social behaviors, such as harmful alcohol use, as a biological contagion, but the theory does not predict who may be exposed to such messages or how far such messages may spread (Christakis and Fowler 2013). Social Impact Theory, which characterizes message impact as a function of the number of sources, the status of the source, and the immediacy of the message, may not apply to SNS information (Latané and Wolf 1981). No statistically significant main effects of user engagement were found. Although Facebook involvement was positively associated with all outcome variables, the actual sources of the comments were the individuals who wrote the comments and who were essentially strangers, with no direct connections to the participants other than the study itself. The Strength of Weak Ties theory may predict why user-generated comments can influence health behavior (Granovetter 1973; Granovetter 1983). However, social connections between individuals who have no knowledge of each other except for a SNS comment are extraordinarily weak and may not be accurately captured by the theory.

Because communication through SNSs is inherently different than traditional forms of communication, it is possible that a new theory specific to SNS messages is needed. A new theory must incorporate the effect of message content and accurately describe how a comment from a veritable stranger can significantly impact health behavior. Although the research described here has provided clues to this novel theory, more studies are needed to fully elucidate all key theory components.

Strengths and Limitations

The studies conducted here have several strengths and limitations. In Study 1, an evaluation of alcohol advertising on Facebook, the primary strength is the use of a well-studied methodology to determine compliance of the ads with a self-regulated alcohol advertising code. Several studies of alcohol advertising have successfully used the rating methods and rating questions employed here (Babor, Xuan, and Damon 2013; Babor et al. 2013; Babor, Xuan, and Proctor 2008; Noel et al. 2017). Moreover, strict levels of inter-rater reliability were employed to ensure that item-level reliability would be considered at least substantial, and although the removal of some questions due to insufficient inter-rater reliability may be seen as a weakness, the ultimate impact on the study results is a more conservative estimate of ad non-compliance. A rigorous process was also used to code the selected Facebook ads and associated user-generated comments for thematic content.

A primary weakness of Study 1 is the potential lack of generalizability. Due to the intensity of current procedures to determine compliance with a self-regulated alcohol advertising code, the number of ads evaluated was substantially smaller than all possible alcohol ads. The final sample of ads was limited to ads produced by only two beer brands that are produced by only one alcohol producer. Although other studies have demonstrated similar ad violation rates across alcohol

producers (Babor et al. 2013; Noel et al. 2017), it is unclear whether the high violation rate for SNS advertising is transferable to producers other than A-B InBev, brands other than Budweiser and Bud Light, products other than beer, or platforms other than Facebook. Moreover, the ads were specifically chosen to reflect alcohol advertising around a large sporting event, which may not be representative of alcohol advertising throughout the year. Particularly for the thematic content analysis of the user-generated comments, low item-level inter-rater reliability was observed for some items despite high levels of percent agreement. Such a discrepancy suggests disagreement between the raters when thematic content is rare, and more intensive training may be needed to accurately identify especially rare thematic events.

The strength of Study 2, a factorial experiment to determine if ad content, user engagement values, or user-generated comments affect ad appeal, drinking intentions, and individual user engagement, principally lies in the experimental design. There was high internal validity, and the randomization procedure was successful. Moreover, the study manipulations were deemed credible by a wide majority of study participants.

There are limitations to Study 2's findings. Study 2 used a relatively small sample size that limited overall study power. Significant main effects of user engagement, user-generated comments on ad appeal, or ad content on drinking intentions and individual user engagement may be observed in a larger study. On the other hand, because multiple models were created, it is possible that there is at least one spurious significant difference due to Type I error. This may have occurred with the association between user-generated comments and individual user engagement, which only became significant after all covariates were added to the model. Additional studies are needed to verify the veracity of this finding.

Because ad content was a within-subjects comparison, it is possible that study participants could have guessed the purpose of the study, which could influence responses, although this is considered unlikely because the ads within the same brand were carefully matched for content. Participants may have purposefully responded differently to Budweiser and Bud Light ads, but this would likely bias the results towards the null since the comparisons of interest were across brands, not within brands. The study also relied on self-report, and it was not possible to verify the truthfulness of participant responses. Order effects could explain the results because each group participant viewed the selected ads in the same order, but because each group viewed the ads in a unique order, any bias in the results would likely be towards the null.

It is possible that the results could have been due to the ads' association with the Super Bowl, which is typically a drinking occasion unto itself, and not the experimental conditions, particularly for the Bud Light ads used because they specifically referenced the Super Bowl. If true, this may have diluted the effect of ad content on drinking intentions and individual user engagement. When repeating the analysis with only Bud Light ads, the main effect of ad content on drinking intentions (OR [95%CI] = 1.08 [0.60, 1.93]) and individual user engagement (OR [95%CI] = 1.52 [0.73, 3.16]) remained non-significant. This indicates that if there is any effect of mentioning the Super Bowl, it is likely small.

Because anti-drinking user-generated comments were compared against pro-drinking comments, it is unknown whether pro-drinking comments significantly increase drinking intentions, anti-drinking comments significantly reduce drinking intentions, or some combination occurs. A similar limitation exists regarding individual user engagement. A larger study that incorporates neutral user-generated comments or no user-generated comments is needed to fully answer this question. Similarly, even though extreme user engagement values were used, each ad

was still associated with non-zero values. Any user engagement may increase positive ad perceptions more than the absence of user engagement. The significant user engagement by user-generated comment interaction that occurred when determining significant effects on drinking intentions also cannot be fully explained. Given the nature of the study, it is possible that high user engagement values reinforce the message of anti-drinking user-generated comments or high user engagement values combined with anti-drinking comments disrupt the reinforcing effects of high user engagement values and pro-drinking comments.

Study 2's findings may not be generalizable. A convenience sample was used, and the sample may not be representative of the population of SNS users who would encounter alcohol advertising. Because participants recruited from Amazon's Mechanical Turk (AMT) are anonymous, it is impossible to verify the accuracy of participants' responses. It is possible that AMT users were untruthful about their age to meet the inclusion/exclusion criteria of the study or lied about their age once enrolled in the study.

However, the study sample was approximately representative of the population of interest, which would not be expected if a significant proportion of participants were untruthful. Median income, marital status, and gender were approximately what was expected based on U.S. Census data (U. S. Census Bureau 2016). The study sample contained slightly more non-White participants and slightly fewer Hispanic participants than expected. It is also possible that AMT users simply answered the study questions as quick as possible to receive the financial incentive, although this is unlikely. On AMT, each respondent is graded on the quality of their response to a task, and the higher a user's grade, the greater probability they will be selected to complete, and get paid for, future tasks. Thus, the AMT user evaluation system creates an incentive whereby users are more apt to provide meaningful answers than produce unthoughtful responses. Even if

the sample adequately represented the underlying population and participants provided thoughtful answers, the study could be prone to social desirability bias. Participants could have reported lower ad appeal, drinking intentions, or individual user engagement than would have occurred if exposed to an alcohol ad outside of a research context.

Another limitation is that the study only assessed the effects of advertisements from two brands of beer, and it is possible that ads from other beer brands or ads that feature wine or distilled spirits will elicit different reactions. The results may also not be generalizable to other SNS platforms because the effects of eWOM and weak social ties created by SNSs may be platform specific. Using Twitter has been shown to be a stronger predictor of purchase intentions than using Facebook (Viljoen, Dube, and Murisi 2016). Although SNSs are more influential than company controlled platforms (Meuter, Brown McCabe, and Curran 2013), they may be less influential than general electronic commerce websites (Yan et al. 2016). Additionally, weak ties may play a more important role on Twitter than elsewhere (Ahn and Park 2015). Because of the inclusion and exclusion criteria used, Study 2 may not be generalizable to individuals below 21 years old or to individuals older than 24 years old. Study 2 may also not be generalizable to non-U.S. population groups. Individuals from relationship-oriented cultures may rely on eWOM on social media to a greater extent than individuals from individualist-oriented cultures (Goodrich and de Mooij 2014), and engagement with eWOM has been shown to be significantly greater among Chinese study participants than American study participants (Chu and Choi 2011). Interestingly, the findings documented by others indicate that the study results found here may be stronger among non-Western cultures.

Future Research Directions

There are several additional analyses and research projects that can be performed based on the results reported here. Ads that were deemed non-compliant in Study 1 can be submitted to the U.S. Beer Institute's Code Compliance Review Board (CCRB) to test whether the alcohol industry's ad complaint process perceives the ads to contain the same violations as the expert raters used in the study and if so, to determine if any ads found non-compliant by the CCRB are removed from Facebook. Secondary data analysis of Study 2 data can be used to investigate possible moderating roles of alcohol use, Facebook involvement, and gender on ad appeal, drinking intentions, and individual user engagement. Analyses can also be used to identify possible mediating roles of alcohol use and Facebook involvement in ad perceptions.

Future research on SNS ad evaluation should be expanded to include multiple SNSs, alcohol brands produced by additional alcohol producers, and other alcohol product types. Future research on SNS user-generated comments should be expanded to include neutral comments and no comment exposure groups. Such a design can be used to determine if pro-drinking user-generated comments increase drinking intentions and individual user engagement, anti-drinking comments reduce drinking intentions and individual user engagement, or both. Future experiments should further investigate the role of user engagement values. Although no significant main effects were observed here, high user engagement values may indirectly influence ad perceptions by reinforcing or reducing the effect of user-generated comments. Future experiments should be designed to specifically address the role of alcohol consumption, Facebook involvement, and gender, and additional variables, such as social support, social interactions, and drinking behaviors of those close to the participant, should be measured. Larger sample sizes may be needed to see significant effects of ad content on drinking intentions and individual user engagement or to adequately

examine any significant interaction terms. Finally, the effect of SNS alcohol ads should be compared with the effect of alcohol portrayals in a typical SNS post and ads published on traditional media (e.g. television, radio, print).

CONCLUSIONS

Self-regulation of alcohol advertising failed to prevent content that may be appealing to vulnerable populations from appearing in Budweiser and Bud Light advertising that was published on Facebook. The violation rate was 82% and a high prevalence of content that may be appealing to young men was detected. Non-compliance with a self-regulated alcohol advertising code is associated with increased emotional ad appeal and decreased informational ad appeal, and these ads are likely to be remembered more strongly and recalled more easily than compliant ads. Although more research is needed, pro-drinking user-generated comments written in response to alcohol advertising on Facebook appear to significantly increase drinking intentions and the odds of an individual Liking or Sharing an alcohol ad. Both outcomes are likely mediators of future alcohol consumption.

Regulations to limit the impact of alcohol advertising on Facebook must focus on the ads and the platform they are published on. Advertising guidelines should be strictly enforced, and the inability of self-regulation to prevent potentially harmful content from appearing in alcohol advertising strongly suggests that statutory regulation is necessary. Revised content guidelines should utilize a permissive structure, and implementation should include a pre-clearance mechanism. Violations of an alcohol advertising code must be accompanied by penalties that are strong enough to serve as an effective deterrent. Regulations that are directed towards the platform should be similar to those passed by Finland and include a ban on publishing content intended to be shared within digital networks and a ban on engaging or commenting on digital alcohol

advertising. The results suggest that user-generated comments could provide an effective and cost-effective medium to distribute health promotion materials, although more research is needed to fully understand the mechanism by which these comments influence drinking intentions. More research is also needed to develop a theory of SNS message impact and diffusion.

REFERENCES

- A-B InBev. 2016. "Responsible Marketing and Communications Code 2.0.". Retrieved July 11, 2016 (http://www.ab-inbev.com/content/dam/universaltemplate/abinbev/pdf/sr/rd/responsible-drinking-2016/AB%20InBev_RMCC%202.0_English_FINAL.pdf).
- ABAC. 2014. "ABAC Responsible Alcohol Marketing Code.". Retrieved July 11, 2016 (<http://www.abac.org.au/wp-content/uploads/2014/06/ABAC-Responsible-Alcohol-Marketing-Code-30-4-14.pdf>).
- Abbey, A. 2002. "Alcohol-related sexual assault: A common problem among college students." *Journal of Studies on Alcohol Supplement* 14:118-128.
- Adlaf, E. M. and P. M. Kohn. 1989. "Alcohol Advertising, Consumption and Abuse: a covariance-structural modelling look at Strickland's data." *British Journal of Addiction* 84(7):749-757.
- Ahn, H. and J.-H. Park. 2015. "The structural effects of sharing function on Twitter networks: Focusing on the retweet function." *Journal of Information Science* 41(3):354-365.
- Ahn, H. Y., L. Wu, S. Kelly, and E. Haley. 2011. "A qualitative study of college student responses to conflicting messages in advertising: anti-binge drinking public service announcements versus wine promotion health messages." *International Journal of Public Health* 56(3):271-279.
- Akar, B. and B. Topçu. 2011. "An Examination of the Factors Influencing Consumers' Attitudes Toward Social Media Marketing." *Journal of Internet Commerce* 10(1):35-67.
- Alexa. n.d. "Top Sites in: All Categories > Computers > Internet > On the Web > Online Communities > Social Networking." Retrieved July 13, 2016

(http://www.alexa.com/topsites/category;0/Computers/Internet/On_the_Web/Online_Communities/Social_Networking).

- Alhabash, S., A. R. McAlister, E. T. Quilliam, J. I. Richards, and C. Lou. 2015. "Alcohol's Getting a Bit More Social: When Alcohol Marketing Messages on Facebook Increase Young Adults' Intentions to Imbibe." *Mass Communication and Society* 18(3):350-375.
- Amoateng, F. and K. Poku. 2013. "The Impact of Advertisement on Alcohol Consumption: A Case Study of Consumers in Bantama Sub-Metro." *International Review of Management and Marketing* 3(1):28-36.
- Anderson, P., A. de Bruijn, K. Angus, R. Gordon, and G. Hastings. 2009. "Impact of alcohol advertising and media exposure on adolescent alcohol use: a systematic review of longitudinal studies." *Alcohol and Alcoholism* 44(3):229-243.
- Arntz, A., C. de Groot, and M. Kindt. 2005. "Emotional memory is perceptual." *Journal of Behavior Therapy and Experimental Psychiatry* 36(1):19-34.
- Austin, E.W. and S.J. Hust. 2005. "Targeting adolescents? The content and frequency of alcoholic and nonalcoholic beverage ads in magazine and video formats November 1999-April 2000." *Journal of Health Communication* 10:769-785.
- Baan, R., K. Straif, Y. Grosse, B. Secretan, F. El Ghissassi, V. Bouvard, A. Altieri, V. Coglian, and WHO I. A. f. R. o. C. M. W. Group. 2007. "Carcinogenicity of alcoholic beverages." *The Lancet Oncology* 8(4):292-293.
- Babor, T. F., R. Caetano, S. Casswell, G. Edwards, N. Giesbrecht, K. Graham, J. W. Grube, L. Hill, H. Holder, R. Hornel, M. Livingston, E. Österberg, J. Rehm, R. Room, and I. Rossow. 2010. *Alcohol: No Ordinary Commodity: Research and Public Policy*. 2nd ed. New York, NY: Oxford University Press.

- Babor, T. F., J. C. Higgins-Biddle, J. B. Saunders, and M. G. Monteiro. 2001. "The alcohol use disorders identification test: Guidelines for use in primary care, second edition." Geneva. Retrieved July 8, 2016 (http://www.talkingalcohol.com/files/pdfs/WHO_audit.pdf).
- Babor, T. F., Z. Xuan, and D. Damon. 2013. "A new method for evaluating compliance with industry self-regulation codes governing the content of alcohol advertising." *Alcoholism: Clinical and Experimental Research* 37(10):1787-1793.
- Babor, T. F., Z. Xuan, D. Damon, and J. Noel. 2013. "An empirical evaluation of the US Beer Institute's self-regulation code governing the content of beer advertising." *American Journal of Public Health* 103:e45-e51.
- Babor, T. F., Z. Xuan, and D. Proctor. 2008. "Reliability of a rating procedure to monitor industry self-regulation codes governing alcohol advertising content." *Journal of Studies on Alcohol and Drugs* 69:235-242.
- Bailey, K. and P. Chapman. 2012. "When can we choose to forget? An ERP study into item-method directed forgetting of emotional words." *Brain and Cognition* 78(2):133-147.
- Baird, T. R., R. G. Wahlers, and C. K. Cooper. 2007. "Non-Recognition of Print Advertising: Emotion Arousal and Gender Effects." *Journal of Marketing Communications* 13(1):39-57.
- Bang, J. H. and W.-N. Lee. 2016. "Consumer Response to Ads in Social Network Sites: An Exploration into the Role of Ad Location and Path." *Journal of Current Issues & Research in Advertising* 37(1):1-14.
- Barnes, H. M., T. McCreanor, I. Goodwin, A. Lyons, C. Griffin, and F. Hutton. 2016. "Alcohol and social media: drinking and drunkenness while online." *Critical Public Health* 26(1):62-76.

- Bartneck, C., A. Duenser, E. Moltchanova, and K. Zawieska. 2015. "Comparing the similarity of responses received from studies in Amazon's Mechanical Turk to studies conducted online and with direct recruitment." *PLoS One* 10(4):e0121595.
- Beccaria, F. 2001. "Italian alcohol advertising: A qualitative content analysis." *Contemporary Drug Problems* 28:391-414.
- Beneke, J., S. de Sousa, M. Mbuyu, and B. Wickham. 2016. "The effect of negative online customer reviews on brand equity and purchase intention of consumer electronics in South Africa." *The International Review of Retail, Distribution and Consumer Research* 26(2):171-201.
- Beullens, K. and L. Vandenbosch. 2016. "A Conditional Process Analysis on the Relationship Between the Use of Social Networking Sites, Attitudes, Peer Norms, and Adolescents' Intentions to Consume Alcohol." *Media Psychology* 19(2):310-333.
- Bohn, M. J., T. F. Babor, and H. R. Kranzler. 1995. "The Alcohol Use Disorders Identification Test (AUDIT): validation of a screening instrument for use in medical settings." *Journal of Studies on Alcohol* 56(4):423-432.
- Booth, B. M. and W. Feng. 2002. "The impact of drinking and drinking consequences on short-term employment outcomes in at-risk drinkers in six southern states." *The Journal of Behavioral Health Services & Research* 29(2):157-166.
- Bordnick, P. S., A. Traylor, H. L. Copp, K. M. Graap, B. Carter, M. Ferrer, and A. P. Walton. 2008. "Assessing reactivity to virtual reality alcohol based cues." *Addictive Behaviors* 33(6):743-756.
- Bouckley, B. 2013. "Anheuser-Busch: Facebook beats any US broadcast network for consumer reach." *Beveragedaily.com*, November 12. Retrieved June 29, 2016

(<http://www.beveragedaily.com/Markets/Anheuser-Busch-Facebook-beats-any-US-broadcast-network-for-consumer-reach>).

- Bradburn, N., S. Sudman, and B. Wansink 2004. "Asking questions about attitudes and behavioral intentions." Pp. 117-150 in *Asking questions: The definitive guide to questionnaire design - For market research, political polls, and social and health questionnaires, revised edition*. San Francisco, CA: John Wiley & Sons.
- Brown, J., C. M. Brignell, S. K. Dhiman, H. V. Curran, and S. K. Kamboj. 2010. "Acute effects of alcohol on memory: Impact of emotional context and serial position." *Neurobiology of Learning and Memory* 93(3):428-434.
- Brumback, T., L. M. Squeglia, J. Jacobus, C. Pulido, S. F. Tapert, and S. A. Brown. 2015. "Adolescent heavy drinkers' amplified brain responses to alcohol cues decrease over one month of abstinence." *Addictive Behaviors* 46:45-52.
- Burton, S., A. Dadich, and A. Soboleva. 2013. "Competing Voices: Marketing and Counter-Marketing Alcohol on Twitter." *Journal of Nonprofit & Public Sector Marketing* 25(2):186-209.
- Campbell, A. J. 1999. "Self-Regulation and the Media." *Federal Communications Law Journal* 51(3):711-772.
- CAMY. 2010. "Youth Exposure to Alcohol Advertising in National Magazines, 2001-2008." Baltimore, MD. Retrieved April 25, 2016
(http://www.camy.org/_docs/resources/reports/youth-exposure-alcohol-advertising-magazine-01-08-full-report.pdf).
- CAMY. 2011. "Youth Exposure to Alcohol Product Advertising on Local Radio in 75 U.S. Markets, 2009." Baltimore, MD. Retrieved April 25, 2016

- (http://www.camy.org/research/Youth_Exposure_to_Alcohol_Advertising_on_Local_Radio_2009/_includes/report.pdf).
- CAMY. 2012. "Youth Exposure to Alcohol Advertising on Television, 2001-2009." Baltimore, MD. Retrieved April 25, 2016
(http://www.camy.org/research/Youth_Exposure_to_Alcohol_Ads_on_TV_Growing_Faster_Than_Adults/_includes/TVReport01-09_Revised_7-12.pdf).
- Cano, C. R. 2007. "The tol of ethnic compatibility in attitude formation. Marketing to America's diverse consumers." Dissertation, Tampa, FL. Retrieved July 8, 2016
(<http://scholarcommons.usf.edu/etd/655>).
- Carah, N. and S., H. L. Brodmerkel. 2014. "Brands and sociality: Alcohol branding, drinking culture and Facebook." *Convergence* 20(3):259-275.
- Cassisi, J. E., M. Delehant, J. S. Tsoutsouris, and J. Levin. 1998. "Psychophysiological reactivity to alcohol advertising in light and moderate social drinkers." *Addictive Behaviors* 23(2):267-274.
- Casswell, S. and J. Zhang. 1998. "Impact of liking for advertising and brand allegiance on drinking and alcohol-related aggression: a longitudinal study." *Addiction* 93(8):1209-1217.
- Castaneda, R., N. Sussman, L. Westreich, R. Levy, and M. O'Malley. 1996. "A review of the effects of moderate alcohol intake on the treatment of anxiety and mood disorder." *Journal of Clinical Psychiatry* 57(5):207-212.
- Ceballos, N. A., R. J. Giuliano, N. Y. Y. Wicha, and R. Graham. 2012. "Acute Stress and Event-Related Potential Correlates of Attention to Alcohol Images in Social Drinkers." *Journal of Studies on Alcohol and Drugs* 73(5):761-771.

- Celebi, S. I. 2015. "How do motives affect attitudes and behaviors toward internet advertising and Facebook advertising?" *Computers in Human Behavior* 51(Part A):312-324.
- Centers for Disease Control and Prevention. 2015. "Explore by Topic." Behavioral Risk Factor Surveillance System. Retrieved March 3, 2016
(http://nccd.cdc.gov/BRFSSPrevalence/rdPage.aspx?rdReport=DPH_BRFSS.ExploreByTopic&islClass=CLASS01&islTopic=Topic03&islYear=2014&go=GO).
- Centers for Disease Control and Prevention. 2015. "Questions." Youth Online: High School YRBS. Retrieved March 23, 2016
(<https://nccd.cdc.gov/Youthonline/App/Results.aspx?LID=XX>).
- Centers for Disease Control and Prevention. 2015. "Youth Online: High School YRBS." Retrieved March 23, 2016
(<https://nccd.cdc.gov/Youthonline/App/Results.aspx?TT=B&OUT=0&SID=HS&QID=H43&LID=LL&YID=RY&LID2=&YID2=&COL=&ROW1=&ROW2=&HT=&LCT=&FS=&FR=&FG=&FSL=&FRL=&FGL=&PV=&TST=&C1=&C2=&QP=&DP=&VA=CI&CS=Y&SYID=&EYID=&SC=&SO=>).
- Centers for Disease Control and Prevention. n.d. "Alcohol-Related Disease Impact (ARDI)." Atlanta, GA. Retrieved March 23, 2016
(http://nccd.cdc.gov/DPH_ARDI/default/default.aspx).
- Centola, D. and M. Macy. 2007. "Complex Contagions and the Weakness of Long Ties." *American Journal of Sociology* 113(3):702-734.
- Chainay, H., G. A. Michael, M. Vert-pré, L. Landré, and A. Plasson. 2012. "Emotional enhancement of immediate memory: Positive pictorial stimuli are better recognized than neutral or negative pictorial stimuli." *Advances in Cognitive Psychology* 8(3):255-266.

- Chang, H. H. and L. H. Wu. 2014. "An examination of negative e-WOM adoption: Brand commitment as a moderator." *Decision Support Systems* 59:206-218.
- Chen, H. 2015. "College-aged young consumers' interpretation of Twitter and marketing information on Twitter." *Young Consumers* 16(2):208-221.
- Cheng, J.-J., Y. Liu, B. Shen, and W.-G. Yuan. 2013. "An epidemic model of rumor diffusion in online social networks." *The European Physical Journal B* 86:29.
- Cheung, R. 2014. "The Influence of Electronic Word-of-Mouth on Information Adoption in Online Customer Communities." *Global Economic Review* 43(1):42-57.
- Chi, H.-H. 2011. "Interactive Digital Advertising vs. Virtual Brand Community: Exploratory Study of User Motivation and Social Media Marketing Responses in Taiwan." *Journal of Interactive Advertising* 12(1):44-61.
- Chipchase, S. Y. and P. Chapman. 2013. "Trade-offs in visual attention and the enhancement of memory specificity for positive and negative emotional stimuli." *The Quarterly Journal of Experimental Psychology* 66(2):277-298.
- Choi, H.-Y., E. A. Kensinger, and S. Rajaram. 2013. "Emotional content enhances true but not false memory for categorized stimuli." *Memory & Cognition* 41(3):403-415.
- Choi, J. H. and J. E. Scott. 2013. "Electronic Word of Mouth and Knowledge Sharing on Social Network Sites: A Social Capital Perspective." *Journal of Theoretical and Applied Electronic Commerce Research* 8(1):69-82.
- Christakis, N. A. and J. H. Fowler. 2013. "Social contagion theory: examining dynamic social networks and human behavior." *Statistics in Medicine* 32(4):556-577.
- Chu, S.-C. 2011. "Viral Advertising in Social Media: Participation in Facebook Groups and Responses among College-Aged Users." *Journal of Interactive Advertising* 12(1):30-43.

- Chu, K.-H., Unger J. B., J.-P. Allem, M. Pattarroyo, D. Soto, T. B. Cruz, H. Yang, L. Jiang, and C. C. Yang. 2015. "Diffusion of Messages from an Electronic Cigarette Brand to Potential Users through Twitter." *PLoS One* 10(12):e0145387.
- Chu, S.-C. and S. M. Choi. 2011. "Electronic Word-of-Mouth in Social Networking Sites: A Cross-Cultural Study of the United States and China." *Journal of Global Marketing* 24(3):263-281.
- Chu, S.-C. and Y. Sung. 2015. "Using a consumer socialization framework to understand electronic word-of-mouth (eWOM) group membership among brand followers on Twitter." *Electronic Commerce Research and Applications* 14(4):251-260.
- Cicchetti, D. V. 1994. "Guidelines, criteria, and rules of thumb for evaluating normed and standardized assessment instruments in psychology." *Psychological Assessment* 6(4):284-290.
- Collins, B. N. and T. H. Brandon. 2002. "Effects of extinction context and retrieval cues on alcohol cue reactivity among nonalcoholic drinkers." *Journal of Consulting and Clinical Psychology* 70(2):390-397.
- Collins, S. E. and K. B. Carey. 2007. "The theory of planned behavior as a model of heavy episodic drinking among college students." *Psychology of Addictive Behaviors* 21(4):498-507.
- Collins, R. L., P. L. Ellickson, D. McCaffrey, and K. Hambarsoomians. 2007. "Early adolescent exposure to alcohol advertising and its relationship to underage drinking." *Journal of Adolescent Health* 40:527-534.

- Collins, R. L., S. C. Martino, S. A. Kovalchik, K. M. Becker, W. G. Shadel, and E. J. D'Amico. 2016. "Alcohol Advertising Exposure Among Middle School-Age Youth: An Assessment Across All Media and Venues." *Journal of Studies on Alcohol and Drugs* 77(3):384-392.
- Cona, G., M. Kliegel, and P. S. Bisiacchi. 2015. "Differential effects of emotional cues on components of prospective memory: an ERP study." *Frontiers in Human Neuroscience* 9:10.
- Connolly, G. M., S. Casswell, J. Zhang, and P. A. Silva. 1994. "Alcohol in the mass media and drinking by adolescents: a longitudinal study." *Addiction* 89(10):1255-1263.
- Conselho de Auto-Regulamentação Publicitária. 2014. "Código brasileiro de auto-regulamentação Publicitária." São Paulo, Brazil. Retrieved July 11, 2016 (<http://www.conar.org.br>).
- Cooke, R., F. Sniehotta, and B. Schuz. 2007. "Predicting binge-drinking behaviour using an extended TPB: Examining the impact of anticipated regret and descriptive norms." *Alcohol and Alcoholism* 42(2):84-91.
- Corrao, G., V. Bagnardi, A. Zambon, and C. La Vecchia. 2004. "A meta-analysis of alcohol consumption and the risk of 15 diseases." *Preventive Medicine* 38:613-619.
- Courtney, K. E., D. G. Ghahremani, and L. A. Ray. 2015. "The effect of alcohol priming on neural markers of alcohol cue-reactivity." *American Journal of Drug and Alcohol Abuse* 41(4):300-308.
- Courtney, K. E. and L. A. Ray. 2014. "Subjective Responses to Alcohol in the Lab Predict Neural Responses to Alcohol Cues." *Journal of Studies on Alcohol and Drugs* 75(1):124-135.
- Cox, W. M., G. N. Yeates, and C. M. Regan. 1999. "Effects of alcohol cues on cognitive processing in heavy and light drinkers." *Drug and Alcohol Dependence* 55(1-2):85-89.

Criss, S., J. A. Woo Baidal, R. E. Goldman, M. Perkins, C. Cunningham, and E. M. Taveras.

2015. "The Role of Health Information Sources in Decision-Making Among Hispanic Mothers During Their Children's First 1000 Days of Life." *Maternal and Child Health Journal* 19(11):2536-2543.

Cynopsis Media. 2015. "Super Bowl: 4M Social shares, 28.4M tweets, 265M Facebook interactions and more." CynopsisMedia. Retrieved July 6, 2016

(<http://www.cynopsis.com/story/super-bowl-4m-social-shares-28-4m-tweets-265m-facebook-interactions/>).

Dager, A. D., B. M. Anderson, R. Rosen, S. Khadka, B. Sawyer, R. E. Jiantonio-Kelly, C. S.

Austad, S. A. Raskin, H. Tennen, R. M. Wood, C. R. Fallahi, and G. D. Pearlson. 2014.

"Functional magnetic resonance imaging (fMRI) response to alcohol pictures predicts subsequent transition to heavy drinking in college students." *Addiction* 109(4):585-595.

Dager, A. D., B. M. Anderson, M. C. Stevens, C. Pulido, R. Rosen, R. E. Jiantonio-Kelly, J. F.

Sisante, S. A. Raskin, H. Tennen, C. S. Austad, R. M. Wood, C. R. Fallahi, and G. D.

Pearlson. 2013. "Influence of Alcohol Use and Family History of Alcoholism on Neural Response to Alcohol Cues in College Drinkers." *Alcoholism: Clinical and Experimental Research* 37(S1):E161-E171.

D'Angelo, J., B. Kerr, and M. A. Moreno. 2014. "Facebook Displays as Predictors of Binge

Drinking: From the Virtual to the Visceral." *Bulletin of Science, Technology & Society* 34(5-6):159-169.

Dao, W. V.-T., A. N. H. Le, J. M.-S. Cheng, and D. C. Chen. 2014. "Social media advertising

value: the case of transitional economies in Southeast Asia." *International Journal of Advertising* 33(2):271-294.

- Dawson, D. A. and L. D. Archer. 1993. "Relative frequency of heavy drinking and the risk of alcohol dependence." *Addiction* 88(11):1509-1518.
- De Keyzer, F., N. Dens, and P. De Pelsmacker. 2015. "Is this for me? How Consumers Respond to Personalized Advertising on Social Network Sites." *Journal of Interactive Advertising* 15(2):124-134.
- de Vries, H., M. N. Elliott, D. E. Kanouse, and S. S. Teleki. 2008. "Using Pooled Kappa to Summarize Interrater Agreement across Many Items." *Field Methods* 20(3):272-282.
- de Vries, L., S. Gensler, and P. S. H. Leeflang. 2012. "Popularity of Brand Posts on Brand Fan Pages: An Investigation of the Effects of Social Media Marketing." *Journal of Interactive Marketing* 26(2):83-91.
- Dehghani, M., M. K. Niaki, I. Ramezani, and R. Sali. 2016. "Evaluating the influence of YouTube advertising for attraction of young customers." *Computers in Human Behavior* 59:165-172.
- Del Chiappa, G., M. Alarcón-del-Amo, and C. Lorenzo-Romero. 2015. "THE INFLUENCE OF USER-GENERATED CONTENT ON TOURISTS' CHOICES/UTJECAJ SADRZAJA KOJI STVARAJU KORISNICI NA ODABIRE TURISTA." *Trziste* 27(2):221-236.
- Deraz, H., G. B. Awuah, and D. A. Gebrekidan. 2015. "FACTORS PREDICTING CONSUMERS' ASSESSMENT OF ADVERTISEMENTS ON SOCIAL NETWORKING SITES." *International Journal of Digital Information and Wireless Communications (IJDWC)* 5(2):111-123.
- Dhar, C. and E. A. Chang. 2009. "Does Chatter Matter? The Impact of User-Generated Content on Music Sales." *Journal of Interactive Marketing* 23(4):300-307.

- Diageo. 2014. "Digital Code." Retrieved July 11, 2016
(<https://www.drinkiq.com/PR1102/media/3375/drinkiq-download-digital-code.pdf>).
- Diageo. 2015. "Diageo Marketing Code: Promoting responsible drinking." Retrieved July 11, 2016
(<http://www.diageo.com/Lists/Resources/Attachments/1287/DiageoMarketingCodeFebruary2015.pdf>).
- Dibie, O. and T. Sumner. 2016. "Using weak ties to understand the resource usage and sharing patterns of a professional learning community." *Social Network Analysis and Mining* 6:27.
- Distilled Spirits Council of the United States, Inc. 2011. "Code of Responsible Practices for Beverage Alcohol Advertising and Marketing." Retrieved July 11, 2016
(http://www.discus.org/assets/1/7/May_26_2011_DISCUS_Code_Word_Version1.pdf).
- Donovan, K., R. Donovan, P. Howat, and N. Weller. 2007. "Magazine alcohol advertising compliance with the Australian Alcoholic Beverages Advertising Code." *Drug and Alcohol Review* 26:73-81.
- Drug Abuse Warning Network. 2013. "The DAWN report: Highlights of the 2011 Drug Abuse Warning Network (DAWN) findings on drug-related emergency department visits." Substance Abuse and Mental Health Services Administration, Rockville, MD. Retrieved September 15, 2016
(<http://www.samhsa.gov/data/sites/default/files/DAWN127/DAWN127/sr127-DAWN-highlights.pdf>).
- Duggan, M., N. B. Ellison, C. Lampe, A. Lenhart, and M. Madden. 2015. "Social Media Update 2014." Pew Research Center. Retrieved July 12, 2016
(<http://www.pewinternet.org/2015/01/09/social-media-update-2014/>).

- Dupre, E. 2013. "Bud Light portrays likeability with Facebook media." *Direct Marketing News*, July 10. Retrieved June 29, 2016 (<http://www.dmnews.com/social-media/bud-light-portrays-likeability-with-facebook-media/article/302516/>).
- Eddie, D., J. F. Buckman, E. Y. Mun, B. Vaschillo, E. Vaschillo, T. Udo, P. Lehrer, and M. E. Bates. 2013. "Different associations of alcohol cue reactivity with negative alcohol expectancies in mandated and inpatient samples of young adults." *Addictive Behaviors* 38(4):2040-2043.
- Ellison, N. B., C. Steinfield, and C. Lampe. 2011. "Connection strategies: Social capital implications of Facebook-enabled communication practices." *New Media & Society* 13(6):873-892.
- Elwalda, A., K. Lü, and M. Ali. 2016. "Perceived derived attributes of online customer reviews." *Computers in Human Behavior* 56:306-319.
- Eschrich, S., T. F. Münte, and E. O. Altenmüller. 2008. "Unforgettable film music: The role of emotion in episodic long-term memory for music." *BMC Neuroscience* 9:48.
- Everaert, J. and E. Koster. 2015. "Interactions among emotional attention, encoding, and retrieval of ambiguous information: an eye-tracking study." *Emotion* 15(5):539-543.
- Farrell, T. and R. Gordon. 2012. "Critical social marketing: Investigating alcohol marketing in the developing world." *Journal of Social Marketing* 2:138-156.
- Feltman, T. S. 1994. "Assessing viewer judgement of advertisements and vehicles: Scale development and validation." in *Advances in Consumer Research*, edited by D. R. John. Provo, UT: Association for Consumer Research.
- Fergie, G., K. Hunt, and S. Hilton. 2013. "What young people want from health-related online resources: a focus group study." *Journal of Youth Studies* 16(5):579-596.

- Ferrari, V., M. M. Bradley, M. Codispoti, M. Karlsson, and P. J. Lang. 2013. "Repetition and brain potentials when recognizing natural scenes: task and emotion differences." *Social Cognitive and Affective Neuroscience* 8(8):847-854.
- Ferré, P. 2003. "Effects of level of processing on memory for affectively valenced words." *Cognition and Emotion* 17(6):859-880.
- Ferré, P., I. Fraga, M. Comesaña, and R. Sánchez-Casas. 2015. "Memory for emotional words: The role of semantic relatedness, encoding task and affective valence." *Cognition and Emotion* 29(8):1401-1410.
- Fielder, L., R. J. Donovan, and R. Ouschan. 2009. "Exposure of children and adolescents to alcohol advertising on Australian metropolitan free-to-air television." *Addiction* 104:1157-1165.
- Finn, T.A. and D.E. Strickland. 1982. "A content analysis of beverage alcohol advertising. II. Television advertising." *Journal of Studies on Alcohol* 43:964-989.
- Fisher, L. B., I. W. Miles, S. B. Austin, C. A. Camargo, and G. A. Colditz. 2007. "Predictors of initiation of alcohol use among US adolescents: findings from a prospective cohort study." *Archives of Pediatrics & Adolescent Medicine* 161(10):959-966.
- Fleischmann, A., V. Poznyak, D. Rekve, and M. Renström. 2014. "Global status report on alcohol and health 2014." Geneva. Retrieved March 23, 2016 (http://www.who.int/substance_abuse/publications/global_alcohol_report/msb_gsr_2014_1.pdf?ua=1).
- Fleiss, J. L. 1986. *The design and analysis of clinical experiments*. New York, NY: John Wiley & Sons.

- Fleming, K., E. Thorson, and C. K. Atkin. 2004. "Alcohol advertising exposure and perceptions: links with alcohol expectancies and intentions to drink or drinking in underaged youth and young adults." *Journal of Health Communication* 9(1):3-29.
- Fournier, A. K., E. Hall, P. Ricke, and B. Storey. 2013. "Alcohol and the social network: Online social networking sites and college students' perceived drinking norms." *Psychology of Popular Media Culture* 2(2):86-95.
- France, K. E., R. J. Donovan, C. Bower, E. J. Elliott, J. M. Payne, H. D'Antoine, and A. E. Bartu. 2014. "Messages that increase women's intentions to abstain from alcohol during pregnancy: results from quantitative testing of advertising concepts." *BMC Public Health* 14:30.
- FreeTV Australia. 2013. "Commerical Television Industry Code of Practice." Retrieved July 11, 2016
(http://www.freetv.com.au/media/Code_of_Practice/2010_Commercial_Television_Industry_Code_of_Practice_July%202013.pdf).
- Gaber, H. R. and L. T. Wright. 2014. "Fast-food advertising in social media: A case study on Facebook in Egypt." *Journal of Business and Retail Management Research* 9(1):52-63.
- Garland, E., I. Franken, and M. Howard. 2012. "Cue-elicited heart rate variability and attentional bias predict alcohol relapse following treatment." *Psychopharmacology* 222(1):17-26.
- Gibbons, J. A., A. Toscano, S. Kofron, C. Rothwell, S. A. Lee, T. D. Ritchie, and W. R. Walker. 2013. "The fading affect bias across alcohol consumption frequency for alcohol-related and non-alcohol-related events." *Consciousness and Cognition* 22(4):1340-1351.
- Gjorgievska, A. 2016. "Google and Facebook Lead Digital Ad Industry to Revenue Record." *Bloomberg*, April 21. Retrieved July 6, 2016

(<http://www.bloomberg.com/news/articles/2016-04-22/google-and-facebook-lead-digital-ad-industry-to-revenue-record>).

Goh, K.-Y., C.-S. Heng, and Z. Lin. 2013. "Social Media Brand Community and Consumer Behavior: Quantifying the Relative Impact of User- and Marketer-Generated Content." *Information Systems Research* 24(1):88-107.

Goodrich, K. and M. de Mooij. 2014. "How 'social' are social media? A cross-cultural comparison of online and offline purchase decision influences." *Journal of Marketing Communications* 20(1-2):103-116.

Gordon, R. 2011. "An audit of alcohol brand websites." *Drug and Alcohol Review* 30(6):638-644.

Gordon, R., F. Harris, A. M. Mackintosh, and C. Moodie. 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., A. M. MacKintosh, and C. Moodie. 2010. "The impact of alcohol marketing on youth drinking behaviour: a two-stage cohort study." *Alcohol and Alcoholism* 45:470-480.

Granovetter, M. S. 1973. "The Strength of Weak Ties." *American Journal of Sociology* 78(6):1360-1380.

Granovetter, M. 1983. "The Strength of Weak Ties: A Network Theory Revisited." *Sociological Theory* 1:201-233.

Grazioli, V. S., T. Dillworth, K. Witkiewitz, C. Andersson, J. R. Kilmer, T. Pace, N. Fossos-Wong, H. Carroll, M. Berglund, J.-B. Daeppen, and M. E. Larimer. 2015. "Protective behavioral strategies and future drinking behaviors: Effect of drinking intentions." *Psychology of Addictive Behaviors* 29(2):355-364.

- Grenard, J. L., C. W. Dent, and A. W. Stacy. 2013. "Exposure to Alcohol Advertisements and Teenage Alcohol-Related Problems." *Pediatrics* 131:e369-e379.
- Gunther, A. C., C. T. Christen, and J. L. C. S. C. Liebhart. 2001. "Congenial public, contrary press, and biased estimates of the climate of opinion." *Public Opinion Quarterly* 65(3):295-320.
- Gunther, A. C. and K. Schmitt. 2004. "Mapping boundaries of the hostile media effect." *Journal of Communication* 54(1):55-70.
- Hadija, Z., S. B. Barnes, and N. Hair. 2012. "Why we ignore social networking advertising." *Qualitative Market Research* 15(1):19-32.
- Hadley, C. B. and D. G. MacKay. 2006. "Does emotion help or hinder immediate memory? Arousal versus priority-binding mechanisms." *Journal of Experimental Psychology: Learning, Memory, and Cognition* 32(1):79-88.
- Haigh, M. M. and W. Shelly. 2015. "Examining the impact of negative, user-generated content on stakeholders." *Corporate Communications* 20(1):63-75.
- Harris, P. A., R. Taylor, R. Thielke, J. Payne, N. Gonzalez, and J. G. Conde. 2009. "Research electronic data capture (REDCap)--a metadata-driven methodology and workflow process for providing translational research informatics support." *Journal of Biomedical Informatics* 42(2):377-381.
- Hasson, F., S. Keeney, and H. McKenna. 2000. "Research guidelines for the Delphi survey technique." *Journal of Advanced Nursing* 32(4):1008-1015.
- Haythornthwaite, C. 2002. "Strong, Weak, and Latent Ties and the Impact of New Media." *The Information Society* 18(5):385-401.

- Haythornthwaite, C. 2005. "Social networks and Internet connectivity effects." *Information, Communication & Society* 8(2):125-147.
- Hebden, R., A. C. Lyons, I. Goodwin, and T. McCreanor. 2015. "“When You Add Alcohol, It Gets That Much Better” University Students, Alcohol Consumption, and Online Drinking Cultures.” *Journal of Drug Issues* 45(2):214-226.
- Heineken. 2008. "Our responsible marketing code." Retrieved July 11, 2016 (<http://www.theheinekencompany.com/-/media/Websites/TheHEINEKENCompany/Downloads/PDF/Sustainability/Positively%20impact%20the%20role%20of%20beer%20in%20society/HEINEKENS%20Responsible%20Marketing%20Code.ashx>).
- Henriksen, L., E. C. Feighery, N. C. Schleicher, and S. P. Fortmann. 2008. "Receptivity to alcohol marketing predicts initiation of alcohol use." *The Journal of Adolescent Health* 42(1):28-35.
- Hoffman, E. W., B. E. Pinkleton, E. Weintraub Austin, and W. Reyes-Velázquez. 2014. "Exploring College Students' Use of General and Alcohol-Related Social Media and Their Associations With Alcohol-Related Behaviors." *Journal of American College Health* 62(5):328-335.
- Holla, B., B. Viswanath, S. M. Agarwal, S. V. Kalmady, A. S. Maroky, D. Jayarajan, R. D. Bharath, G. Venkatasubramanian, and V. Benegal. 2014. "Visual Image-Induced Craving for Ethanol (VICE): Development, Validation, and a Pilot fMRI Study." *Indian Journal of Psychological Medicine* 36(2):164-169.
- Hoy, M. G. and G. Milne. 2010. "Gender Differences in Privacy-Related Measures for Young Adult Facebook Users." *Journal of Interactive Advertising* 10(2):28-45.

- Huang, J.-H., T.-T. Hsiao, and Y.-F. Chen. 2012. "The Effects of Electronic Word of Mouth on Product Judgment and Choice: The Moderating Role of the Sense of Virtual Community." *Journal of Applied Social Psychology* 42(9):2326-2347.
- Huang, G. C., D. Soto, K. Fujimoto, and T. W. Valente. 2014. "The Interplay of Friendship Networks and Social Networking Sites: Longitudinal Analysis of Selection and Influence Effects on Adolescent Smoking and Alcohol Use." *American Journal of Public Health* 104(8):e51-e59.
- Huang, G. C., J. B. Unger, D. Soto, K. Fujimoto, M. A. Pentz, M. Jordan-Marsh, and T. W. Valente. 2014. "Peer Influences: The Impact of Online and Offline Friendship Networks on Adolescent Smoking and Alcohol Use." *Journal of Adolescent Health* 54(5):508-514.
- Hunt, K., H. Sweeting, J. Sargent, H. Lewars, R. Young, and P. West. 2011. "Is there an association between seeing incidents of alcohol or drug use in films and young Scottish adults' own alcohol or drug use? A cross sectional study." *BMC Public Health* 11:259.
- Hurtado, M. 2013. "Advertising to children in Mexico." *Young Consumers* 14(1). Retrieved March 30, 2016 (<http://www.emeraldinsight.com/doi/full/10.1108/yc.2013.32114aaa.002>).
- Hutter, K., J. Hautz, S. Dennhardt, and J. Füller. 2013. "The impact of user interactions in social media on brand awareness and purchase intention: the case of MINI on Facebook." *The Journal of Product and Brand Management* 22(5/6):342-351.
- Ihssen, N., W. M. Cox, A. Wiggett, J. S. Fadardi, and D. E. Linden. 2011. "Differentiating heavy from light drinkers by neural responses to visual alcohol cues and other motivational stimuli." *Cerebral Cortex* 21(6):1408-1415.
- Ingjaldsson, J. T., J. F. Thayer, and J. C. Laberg. 2003. "Craving for alcohol and pre-attentive processing of alcohol stimuli." *International Journal of Psychophysiology* 49(1):29-39.

- Ingjaldsson, J. T., J. F. Thayer, and J. C. Laberg. 2003. "Preattentive processing of alcohol stimuli." *Scandinavian Journal of Psychology* 44(2):161-165.
- Institute of Alcohol Studies. 2013. "Alcohol advertising in the European Union." London. Retrieved March 30, 2016 (<http://www.ias.org.uk/Alcohol-knowledge-centre/Marketing/Factsheets/Alcohol-advertising-in-the-European-Union.aspx>).
- International Alliance for Responsible Drinking. 2011. "Guiding Principles: Self-Regulation of Marketing Communications for Beverage Alcohol." Retrieved July 11, 2016 (<http://www.iard.org/wp-content/uploads/2016/01/Guiding-Principles.pdf>).
- International Alliance for Responsible Drinking. 2014. "Digital Guiding Principles." Retrieved July 11, 2016 (<http://www.k-message.com/wp-content/uploads/2014/10/Digital-Guiding-Principles-DGPs.pdf>).
- Ivory, N. J., N. Kambouropoulos, and P. K. Staiger. 2014. "Cue reward salience and alcohol cue reactivity." *Personality and Individual Differences* 69:217-222.
- Jernigan, D., J. Noel, J. Landon, N. Thornton, and T. Lobstein. 2017. "Alcohol marketing and youth alcohol consumption: A systematic review of longitudinal studies published since 2008." *Addiction* 112(Suppl 1):7-20.
- Jernigan, D. H., J. Ostroff, C. S. Ross, T. S. Naimi, and R. D. Brewer. 2006. "Youth exposure to alcohol advertising on radio - United States, June-August 2004." *MMWR Morbidity and Mortality Weekly Report* 55:937-940.
- Jernigan, D. H., C. S. Ross, J. Ostroff, L. R. McKnight-Eily, and R. D. Brewer. 2013. "Youth exposure to alcohol advertising on television--25 markets, United States, 2010." *MMWR Morbidity and Mortality Weekly Report* 62:877-880.

- Jernigan, D. H. and A. E. Rushman. 2014. "Measuring youth exposure to alcohol marketing on social networking sites: Challenges and prospects." *Journal of Public Health Policy* 35:91-104.
- Jones, S. C. and R. J. Donovan. 2002. "Self-regulation of alcohol advertising: is it working for Australia?" *Journal of Public Affairs* 2:153-165.
- Jones, S. C., D. Hall, and G. Munro. 2008. "How effective is the revised regulatory code for alcohol advertising in Australia?" *Drug and Alcohol Review* 27:29-38.
- Jones, S. C. and C. A. Magee. 2011. "Exposure to alcohol advertising and alcohol consumption among Australian adolescents." *Alcohol and Alcoholism* 46(5):630-637.
- Jones, S. C., L. Phillipson, and L. Barrie. 2010. "'Most men drink... especially like when they play sports' – alcohol advertising during sporting broadcasts and the potential impact on child audiences." *Journal of Public Affairs* 10:59-73.
- Jones, S. C. and K. M. Smith. 2011. "The Effect of Point of Sale Promotions on the Alcohol Purchasing Behaviour of Young People in Metropolitan, Regional and Rural Australia." *Journal of Youth Studies* 14(8):885-900.
- Jung, J., S. W. Shim, H. S. Jin, and H. Khang. 2016. "Factors affecting attitudes and behavioural intention towards social networking advertising: a case of Facebook users in South Korea." *International Journal of Advertising: The Review of Marketing Communications* 35(2):248-265.
- Kambouropoulos, N. and P. K. Staiger. 2001. "The influence of sensitivity to reward on reactivity to alcohol-related cues." *Addiction* 96(8):1175-1185.

- Kambouropoulos, N. and P. K. Staiger. 2004. "Reactivity to Alcohol-Related Cues: Relationship Among Cue Type, Motivational Processes, and Personality." *Psychology of Addictive Behaviors* 18(3):275-283.
- Kambouropoulos, N. and P. K. Staiger. 2009. "'Cue reward salience' predicts craving in response to alcohol cues." *Personality and Individual Differences* 46(2):78-82.
- Kang, C., Z. Wang, A. Surina, and W. Lü. 2014. "Immediate emotion-enhanced memory dependent on arousal and valence: The role of automatic and controlled processing." *Acta Psychologica* 150:153-160.
- Kaufman, Z. A., E. N. Braunschweig, J. Feeney, S. Dringus, H. Weiss, S. Delany-Moretlwe, and D. A. Ross. 2014. "Sexual Risk Behavior, Alcohol Use, and Social Media Use Among Secondary School Students in Informal Settlements in Cape Town and Port Elizabeth, South Africa." *AIDS and Behavior* 18(9):1661-1674.
- Kavanaugh, A. L., D. D. Reese, J. M. Carroll, and M. B. Rosson. 2005. "Weak Ties in Networked Communities." *The Information Society* 21(2):119-131.
- Kelly, L., G. Kerr, and J. Drennan. 2010. "Avoidance of Advertising in Social Networking Sites: The Teenage Perspective." *Journal of Interactive Advertising* 10(2):16-27.
- Kensinger, E. A., H.-Y. Choi, B. D. Murray, and S. Rajaram. 2016. "How social interactions affect emotional memory accuracy: Evidence from collaborative retrieval and social contagion paradigms." *Memory & Cognition* 44(5):706-716.
- Kensinger, E. A., R. J. Garoff-Eaton, and D. L. Schacter. 2007. "Effects of emotion on memory specificity in young and older adults." *Journal of Gerontology Series B: Psychological Sciences* 62(4):208-215.

- Kensinger, E. A., R. J. Garoff-Eaton, and D. L. Schacter. 2007. "Effects of emotion on memory specificity: Memory trade-offs elicited by negative visually arousing stimuli." *Journal of Memory and Language* 56(4):575-591.
- Kesmodel, U., K. Wisborg, S. F. Olsen, T. B. Henriksen, and N. J. Sechler. 2002. "Moderate alcohol intake in pregnancy and the risk of spontaneous abortion." *Alcohol & Alcoholism* 37(1):87-92.
- Ketelaar, P. E., R. Konig, E. G. Smit, and H. Thorbjørnsen. 2015. "In ads we trust. Religiousness as a predictor of advertising trustworthiness and avoidance." *Journal of Consumer Marketing* 32(3):190-198.
- Kim, J. and P. Gupta. 2012. "Emotional expressions in online user reviews: How they influence consumers' product evaluations." *Journal of Business Research* 65(7):985-992.
- Kim, S. M., D. H. Han, K. J. Min, B. N. Kim, and J. H. Cheong. 2014. "Brain activation in response to craving- and aversion-inducing cues related to alcohol in patients with alcohol dependence." *Drug and Alcohol Dependence* 141:124-131.
- Kim, J., C. Lee, and T. Elias. 2015. "Factors affecting information sharing in social networking sites amongst university students: Application of the knowledge-sharing model to social networking sites." *Online Information Review* 39(3):290-309.
- Kim, E. M. and Y. H. Sun. 2006. "The effect of replies in Internet news on the audience." *Korean Journal of Journalism & Communication Studies* 50:33-64.
- Kim, E., Y. Sung, and H. Kang. 2014. "Brand followers' retweeting behavior on Twitter: How brand relationships influence brand electronic word-of-mouth." *Computers in Human Behavior* 37:18-25.

- Kim, J. S.-C., G. Vossel, and M. Gamer. 2013. "Effects of Emotional Context on Memory for Details: The Role of Attention." *PLoS One* 8(10):e77405.
- Knight, M. and M. Mather. 2009. "Reconciling findings of emotion-induced memory enhancement and impairment of preceding items." *Emotion* 9(6):763-781.
- Knoll, J. and R. Proksch. 2015. "Why we watch others' responses to online advertising – investigating users' motivations for viewing user-generated content in the context of online advertising." *Journal of Marketing Communications*.
- Koordeman, R., D. J. Anschutz, and R. C. M. E. Engels. 2011. "Exposure to alcohol commercials in movie theaters affects actual alcohol consumption in young adult high weekly drinkers: an experimental study." *The American Journal on Addictions* 20(3):285-291.
- Koordeman, R., D. J. Anschutz, and R. C. M. E. Engels. 2012. "The Effect of Alcohol Advertising on Immediate Alcohol Consumption in College Students: An Experimental Study." *Alcoholism: Clinical and Experimental Research* 36(5):874-880.
- Koordeman, R., E. Kuntsche, D. J. Anschutz, R. B. van Baaren, and R. C. Engels. 2011. "Do we act upon what we see? Direct effects of alcohol cues in movies on young adults' alcohol drinking." *Alcohol and Alcoholism* 46(4):393-398.
- Koroleva, K., H. Krasnova, V. Stimac, and D. Kunze. 2011. "I like it because I(M) like you - measuring user attitudes towards information on facebook." *International Conference on Information Systems 2011* 2:1223-1241.
- Kramer, A. D. I., J. E. Guillory, and J. T. Hancock. 2014. "Experimental evidence of massive-scale emotional contagion through social networks." *PNAS* 111(24):8788-8790.

- Kramer, D. A. and S. R. Schmidt. 2007. "Alcohol beverage cues impair memory in high social drinkers." *Cognition and Emotion* 21(7):1535-1545.
- Kreager, D. A. and D. L. Haynie. 2011. "Dangerous Liaisons? Dating and Drinking Diffusion in Adolescent Peer Networks." *American Sociological Review* 76(5):737-763.
- Krienke, U. J., F. Nikesch, K. Spiegelhalder, J. Hennig, H. M. Olbrich, and J. M. Langosch. 2014. "Impact of Alcohol-Related Video Sequences on Functional MRI in Abstinent Alcoholics." *European Addiction Research* 40(1):33-40.
- Ksiazek, T. B., L. Peer, and K. Lessard. 2016. "User engagement with online news: Conceptualizing interactivity and exploring the relationship between online news videos and user comments." *New Media & Society* 18(3):502-520.
- Kumar, S. 2016. "Cheers: 3 ways alcohol brands can join the party on Pinterest." Pinterest. Retrieved July 12, 2016 (<https://business.pinterest.com/en/blog/cheers-3-ways-alcohol-brands-can-join-party-pinterest>).
- Kumas, V., J. A. Petersen, and R. P. Leone. 2007. "How valuable is word of mouth?" *Harvard Business Review* 85(10):139-146.
- Kwate, N. O. and I. H. Meyer. 2009. "Association between residential exposure to outdoor alcohol advertising and problem drinking among African American women in New York City." *American Journal of Public Health* 99:228-230.
- Kwon, E. S., E. Kim, Y. Sung, and C. Yun Yoo. 2014. "Brand Followers." *International Journal of Advertising* 33(4):657-680.
- Landis, J. R. and G. G. Koch. 1977. "The measurement of observer agreement for categorical data." *Biometrics* 33(1):159-174.

- Laranjo, L., A. Arguel, A. L. Neves, A. M. Gallagher, R. Kaplan, N. Mortimer, G. A. Mendes, and A. Y. Lau. 2015. "The influence of social networking sites on health behavior change: a systematic review and meta-analysis." *Journal of the American Medical Informatics Association* 22(1):243-256.
- Lasky, M. 2016. "3 takeaways from the FTC's first deceptive marketing case under new native ad rules." *PR Week*, April 15. Retrieved June 29, 2016 (<http://www.prweek.com/article/1391111/3-takeaways-ftcs-first-deceptive-marketing-case-new-native-ad-rules>).
- Latané, B. and S. Wolf. 1981. "The social impact of majorities and minorities." *Psychological Review* 88(5):438-453.
- Lee, E. 2012. "That's Not the Way It Is: How User-Generated Comments on the News Affect Perceived Media Bias." *Journal of Computer-Mediated Communication* 18(1):32-45.
- Lee, E.-J. 2012. "That's Not the Way It Is: How User-Generated Comments on the News Affect Perceived Media Bias." *Journal of Computer-Mediated Communication*. 18(1):32-45.
- Lee, C. H. and D. A. Cranage. 2014. "Toward Understanding Consumer Processing of Negative Online Word-of-Mouth Communication." *Journal of Hospitality & Tourism Research* 38(3):330-360.
- Lee, J. and I. B. Hong. 2016. "Predicting positive user responses to social media advertising: The roles of emotional appeal, informativeness, and creativity." *International Journal of Information Management* 36(3):360-373.
- Lee, E.-J. and Y. J. Jang. 2010. "What Do Others' Reactions to News on Internet Portal Sites Tell Us? Effects of Presentation Format and Readers' Need for Cognition on Reality Perception." *Communication Research* 37(6):825-846.

- Lee, J. S., K. Namkoong, J. Ku, S. Cho, J. Y. Park, Y. K. Choi, J. J. Kim, I. Y. Kim, S. I. Kim, and Y. C. Jung. 2008. "Social pressure-induced craving in patients with alcohol dependence: application of virtual reality to coping skill training." *Psychiatry investigation* 5(4):239-243.
- Lee, E., K. Namkoong, C. H. Lee, S. K. An, and B. O. Lee. 2006. "Differences of Photographs Inducing Craving Between Alcoholics and Non-alcoholics." *Yonsei Medical Journal* 47(4):491-497.
- Lenhart, A. 2015. "Teens, Social Media & Technology Overview 2015." Pew Research Center. Retrieved July 6, 2016 (<http://www.pewinternet.org/2015/04/09/teens-social-media-technology-2015/>).
- Leonard, K. E. and J. C. Rothbard. 1999. "Alcohol and the marriage effect." *Journal of Studies on Alcohol Supplement* 13:139-146.
- Libkuman, T., C. Stabler, and H. Otani. 2004. "Arousal, valence, and memory for detail." *Memory* 12(2):237-247.
- Lim, W. M. 2015. "THE INFLUENCE OF INTERNET ADVERTISING AND ELECTRONIC WORD OF MOUTH ON CONSUMER PERCEPTIONS AND INTENTION: SOME EVIDENCE FROM ONLINE GROUP BUYING." *The Journal of Computer Information Systems* 55(4):81-89.
- Lim, S. S., T. Vos, A. D. Flaxman, G. Danaei, K. Shibuya, H. Adair-Rohani, M. Amann, H. R. Anderson, K. G. Andrews, M. Aryee, C. Atkinson, L. J. Bacchus, A. N. Bahalim, K. Balakrishnan, J. Balmes, S. Barker-Collo, A. Baxter, and et al. 2012. "A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010." *The Lancet* 380(9859):2224-2260.

- Lin, E.-Y., S. Caswell, R. Q. You, and T. Huckle. 2012. "Engagement with alcohol marketing and early brand allegiance in relation to early years of drinking." *Addiction Research & Theory* 20(4):329-338.
- Litt, M. D., N. L. Cooney, and P. Morse. 2000. "Reactivity to alcohol-related stimuli in the laboratory and in the field: predictors of craving in treated alcoholics." *Addiction* 95(6):889-900.
- Litt, D. M. and M. L. Stock. 2011. "Adolescent alcohol-related risk cognitions: The roles of social norms and social networking sites." *Psychology of Addictive Behaviors* 25(4):708-713.
- Liu, Y., B. Wang, B. Wu, S. Shang, Y. Zhang, and C. Shi. 2016. "Characterizing super-spreading in microblog: An epidemic-based information propagation model." *Physica A: Statistical Mechanics and its Applications* 463:202-218.
- Lu, T. 2013. "Effectiveness of health messages to change women's thin-ideal and unhealthy weight control intentions: Connecting social norms and social networks approaches." *Asian Journal of Communication* 23(5):519-537.
- Lyons, A. C., I. Goodwin, T. McCreanor, and C. Griffin. 2015. "Social networking and young adults' drinking practices: Innovative qualitative methods for health behavior research." *Health Psychology* 34(4):293-302.
- Mackay, D., M. Shafto, J. Taylor, D. Marian, L. Abrams, and J. Dyer. 2004. "Relations between emotion, memory, and attention: Evidence from taboo Stroop, lexical decision, and immediate memory tasks." *Memory & Cognition* 32(3):474-488.
- Madden, M., A. Lenhart, S. Cortesi, U. Gasser, M. Duggan, A. Smith, and M. Beaton. 2013. "Teens, Social Media, and Privacy." Pew Research Center. Retrieved July 6, 2016 (<http://www.pewinternet.org/2013/05/21/teens-social-media-and-privacy/>).

- Marczinski, C. A., H. Hertenberg, P. Goddard, S. F. Maloney, A. L. Stamates, and K. O'Connor. 2016. "Alcohol-related Facebook activity predicts alcohol use patterns in college students." *Addiction Research & Therapy*.
- Mart, S. and N. Giesbrecht. 2015. "Red flags on pinkwashed drinks: contradictions and dangers in marketing alcohol to prevent cancer." *Addiction* 110(10):1541-1548.
- Martino, S. C., S. A. Kovalchik, R. L. Collins, K. M. Becker, W. G. Shadel, and E. J. D'Amico. 2016. "Ecological momentary assessment of the association between exposure to alcohol advertising and early adolescents' beliefs about alcohol." *Journal of Adolescent Health* 58:85-91.
- Mason, B., J. Light, T. Escher, and D. Drobos. 2008. "Effect of positive and negative affective stimuli and beverage cues on measures of craving in non treatment-seeking alcoholics." *Psychopharmacology* 200(1):141-150.
- Mastro, D. E. and C. Atkin. 2002. "Exposure to Alcohol Billboards and Beliefs and Attitudes toward Drinking among Mexican American High School Students." *Howard Journal of Communications* 13(2):129-151.
- McClure, A. C., S. Dal Cin, J. Gibson, and J. D. Sargent. 2006. "Ownership of Alcohol-Branded Merchandise and Initiation of Teen Drinking." *American Journal of Preventive Medicine* 30(4):277-283.
- McClure, A. C., M. Stoolmiller, S. E. Tanski, R. C. M. E. Engels, and J. D. Sargent. 2013. "Alcohol Marketing Receptivity, Marketing-Specific Cognitions, and Underage Binge Drinking." *Alcoholism: Clinical and Experimental Research* 37(S1):e404-e413.

- McClure, A. C., M. Stoolmiller, S. E. Tanski, K. A. Worth, and J. D. Sargent. 2009. "Alcohol-branded merchandise and its association with drinking attitudes and outcomes in US adolescents." *Archives of Pediatrics & Adolescent Medicine* 163(3):211-217.
- McClure, A. C., S. E. Tanski, Z. Li, K. Jackson, M. Morgenstern, Z. Li, and J. D. Sargent. 2016. "Internet Alcohol Marketing and Underage Alcohol Use." *Pediatrics* 137(2):e20152149.
- McCormick, K. 2016. "Celebrity endorsements: Influence of a product-endorser match on Millennials attitudes and purchase intentions." *Journal of Retailing and Consumer Services* 32:39-45.
- McKee, P., R. Jones-Webb, P. Hannan, and L. Pham. 2011. "Malt liquor marketing in inner cities: the role of neighborhood racial composition." *Journal of Ethnicity in Substance Abuse* 10(1):24-38.
- McMillan, B. and M. Conner. 2003. "Using the theory of planned behaviour to understand alcohol and tobacco use in students." *Psychology, Health & Medicine* 8(3):317-328.
- Mehta, A. and S. C. Purvis. 2006. "Reconsidering Recall and Emotion in Advertising." *Journal of Advertising Research* 46(1):49-56.
- Meola, A. 2016. "Advertisers are now flocking to Instagram." Business Insider. Retrieved May 18, 2016 (<http://www.businessinsider.com/instagram-becomes-major-digital-media-platform-for-advertisers-2016-5>).
- Merriam-Webster. n.d. "social media." Retrieved July 12, 2016 (<http://www.merriam-webster.com/dictionary/social%20media>).
- Meuter, M. L., D. Brown McCabe, and J. M. Curran. 2013. "Electronic Word-of-Mouth Versus Interpersonal Word-of-Mouth: Are All Forms of Word-of-Mouth Equally Influential?" *Services Marketing Quarterly* 34(3):240-256.

- Miller, J. W., T. S. Naimi, R. D. Brewer, and S. E. Jones. 2007. "Binge drinking and associated health risk behaviors among high school students." *Pediatrics* 119:76-85.
- Miller, J., I. Prichard, A. Hutchinson, and C. Wilson. 2014. "The Relationship Between Exposure to Alcohol-Related Content on Facebook and Predictors of Alcohol Consumption Among Female Emerging Adults." *CyberPsychology, Behavior & Social Networking* 17(12):735-741.
- Mir, I. A. and K. U. Rehman. 2013. "Factors affecting consumer attitudes and intentions toward user-generated product content on YouTube." *Management & Marketing* 8(4):637-654.
- Mohler-Kuo, M., G. W. Dowdall, M. Koss, and H. Wechsler. 2004. "Correlates of rape while intoxicated in a national sample of college women." *Journal of Studies on Alcohol* 65(1):37-45.
- Monti, P. M., J. A. Binkoff, D. B. Abrams, W. R. Zwick, T. D. Nirenberg, and M. R. Liepman. 1987. "Reactivity of alcoholics and nonalcoholics to drinking cues." *Journal of Abnormal Psychology* 96(2):122-126.
- Moraes, C., N. Michaelidou, and R. W. Meneses. 2014. "The use of Facebook to promote drinking among young consumers." *Journal of Marketing Management* 30(13-14):1377-1401.
- Moreno, M. A., D. A. Christakis, K. G. Egan, L. N. Brockman, and T. Becker. 2012. "Associations Between Displayed Alcohol References on Facebook and Problem Drinking Among College Students." *Archives of Pediatrics and Adolescent Medicine* 166(2):157-163.
- Moreno, M. A., E. D. Cox, H. N. Young, and W. Haaland. 2015. "Underage College Students' Alcohol Displays on Facebook and Real-Time Alcohol Behaviors." *Journal of Adolescent Health* 56(6):646-651.

- Morgenstern, M., B. Isensee, J. D. Sargent, and R. Hanewinkel. 2011. "Attitudes as mediators of the longitudinal association between alcohol advertising and youth drinking." *Archives of Pediatrics & Adolescent Medicine* 165(7):610-616.
- Morgenstern, M., Z. Li, Z. Li, and J. D. Sargent. 2016. "The party effect: Prediction of future alcohol use based on exposure to specific alcohol advertising content." *Addiction*.
- Morgenstern, M., J. D. Sargent, H. Sweeting, F. Faggiano, F. Mathis, and R. Hanewinkel. 2014. "Favourite alcohol advertisements and binge drinking among adolescents: a cross-cultural cohort study." *Addiction* 109(12):2005-2015.
- Morris, J. D., Y. Choi, and I. Ju. 2016. "Are Social Marketing and Advertising Communications (SMACs) Meaningful?: A Survey of Facebook User Emotional Responses, Source Credibility, Personal Relevance, and Perceived Intrusiveness." *Journal of Current Issues & Research in Advertising* 37(2):165-182.
- Muchnik, L., S. Aral, and S. J. Taylor. 2013. "Social influence bias: A randomized experiment." *Science* 341(6146):647-651.
- National Assembly of Thailand 2008. "Alcohol Control Act 2008." in *Published Vol.125, Part 33a*.
- Nguyen-Louie, T. T., J. F. Buckman, S. Ray, and M. E. Bates. 2016. "Drinkers' memory bias for alcohol picture cues in explicit and implicit memory tasks." *Drug and Alcohol Dependence* 160:90-96.
- Nhean, S., J. Nyborn, D. Hinchey, H. Valerio, K. Kinzel, M. Siegel, and D. H. Jernigan. 2014. "The frequency of company-sponsored alcohol brand-related sites on Facebook™-2012." *Substance Use & Misuse* 49(7):779-782.

- Nicholls, J. 2012. "Everyday, everywhere: alcohol marketing and social media--current trends." *Alcohol and Alcoholism* 47:486-493.
- Nicholls, J. 2012. "Everyday, Everywhere: Alcohol Marketing and Social Media—Current Trends." *Alcohol and Alcoholism* 47(4):486-493.
- Noel, J. K. and T. F. Babor. 2017. "Does Industry Self-regulation Protect Young Persons from Exposure to Alcohol Marketing? A Review of Compliance and Complaint Studies." *Addiction* 112(Suppl 1):51-56.
- Noel, J. K., T. F. Babor, and K. Robaina. 2017. "Industry self-regulation of alcohol marketing: A systematic review of content and exposure research." *Addiction* 112(Suppl 1):28-50.
- Noel, J. K., T. F. Babor, K. Robaina, M. Feulner, A. Vendrame, and M. Monteiro. 2017. "Alcohol Marketing in the Americas and Spain during the 2014 FIFA World Cup Tournament." *Addiction* 112(Suppl 1):64-73.
- Noel, J. K., Z. Xuan, and T. F. Babor. 2015. "Associations between viewers' membership in a vulnerable population and alcohol ad perception." Munich, Germany.
- Noel, J. K., Z. Xuan, and T. F. Babor. 2017. "Associations between Thematic Content and Industry Self-regulation Code Violations in Beer Advertising Broadcast during the U.S. NCAA Basketball Tournament." *Substance Use & Misuse*.
- Norman, P. 2011. "The theory of planned behavior and binge drinking among undergraduate students: Assessing the impact of habit strength." *Addictive Behaviors* 36(5):502-507.
- O'Brien, H. L. and E. G. Toms. 2008. "What is user engagement? A conceptual framework for defining user engagement with technology." *Journal of the American Society for Information Science and Technology* 59(6):938-955.

- Okazaki, S. and M. J. Yagüe. 2012. "Responses to an advergaming campaign on a mobile social networking site: An initial research report." *Computers in Human Behavior* 28(1):78-86.
- Onnela, J.-P., J. Saramäki, J. Hyvönen, G. Szabó, D. Lazer, K. Kaski, J. Kertész, and A.-L. Barabási. 2007. "Structure and tie strengths in mobile communication networks." *Proceedings of the National Academy of Sciences of the United States of America* 104(18):7332-7336.
- Ostafin, B. D. and T. P. Palfai. 2006. "Compelled to consume: The Implicit Association Test and automatic alcohol motivation." *Psychology of Addictive Behaviors* 20(3):322-327.
- Ott, H. K., M. Vafeiadis, S. Kumble, and T. F. Waddell. 2016. "Effect of Message Interactivity on Product Attitudes and Purchase Intentions." *Journal of Promotion Management* 22(1):89-106.
- Outdoor Media Association. 2014. "OMA Alcohol Advertising Guidelines." Retrieved July 11, 2016 (http://oma.org.au/__data/assets/pdf_file/0005/9617/OMA_Alcohol_Guidelines_2014_FINAL.pdf).
- Paek, H. J., T. Hove, and J. Jeon. 2013. "Social media for message testing: a multilevel approach to linking favorable viewer responses with message, producer, and viewer influence on YouTube." *Health Communication* 28(3):226-236.
- Palzer, C. 2003. "European provisions for the establishment of co-regulation frameworks." *Media Law & Policy* 13(1):7-27.
- Papachristou, H., C. Nederkoorn, J. Corstjens, and A. Jansen. 2012. "The role of impulsivity and perceived availability on cue-elicited craving for alcohol in social drinkers." *Psychopharmacology* 224(1):145-153.

- Papachristou, H., C. Nederkoorn, J. C. A. H. Giesen, and A. Jansen. 2014. "Cue reactivity during treatment, and not impulsivity, predicts an initial lapse after treatment in alcohol use disorders." *Addictive Behaviors* 39(3):737-739.
- Papachristou, H., C. Nederkoorn, R. Havermans, P. Bongers, S. Beunen, and A. Jansen. 2013. "Higher levels of trait impulsiveness and a less effective response inhibition are linked to more intense cue-elicited craving for alcohol in alcohol-dependent patients." *Psychopharmacology* 228(4):641-649.
- Papachristou, H., C. Nederkoorn, R. Havermans, M. Horst, and A. Jansen. 2012. "Can't stop the craving: The effect of impulsivity on cue-elicited craving for alcohol in heavy and light social drinkers." *Psychopharmacology* 219(2):511-518.
- Parker, B. J. 1998. "Exploring Life Themes and Myths in Alcohol Advertisements through a Meaning-Based Model of Advertising Experiences." *Journal of Advertising* 27(1):97-112.
- Parlement français 1991. "LOI relative à la lutte contre le tabagisme et l'alcoolisme." in *Pub. L. No. 91-32*.
- Pavelchak, M. A., J. H. Antil, and J. M. Munch. 1988. "The Super Bowl: An Investigation into the Relationship Among Program Context, Emotional Experience, and Ad Recall." *Journal of Consumer Research* 15(3):360-367.
- Payne, B. K. and E. Corrigan. 2007. "Emotional constraints on intentional forgetting." *Journal of Experimental Social Psychology* 43(5):780-786.
- Perrin, A. 2015. "Social Media Usage: 2005-2015." Pew Research Center. Retrieved July 12, 2016 (<http://www.pewinternet.org/2015/10/08/social-networking-usage-2005-2015/>).

- Peterson, T. 2016. "Facebook's mobile ad revenue grew by 76% to \$4.26 billion in Q1 2016." Marketing Land. Retrieved May 18, 2016 (<http://marketingland.com/facebook-q1-2016-earnings-174903>).
- Peterson, T. 2016. "Twitter's Monthly User Growth Stalls, Ad Revenue Climbs." Advertising Age. Retrieved May 18, 2016 (<http://adage.com/article/digital/twitter-q4-2016-earnings/302648/>).
- Petit, G., C. Kornreich, B. Dan, P. Verbanck, and S. Campanella. 2014. "Electrophysiological correlates of alcohol- and non-alcohol-related stimuli processing in binge drinkers: a follow-up study." *Journal of Psychopharmacology* 28(11):1041-1052.
- Petit, G., C. Kornreich, P. Maurage, X. Noël, C. Letesson, P. Verbanck, and S. Campanella. 2012. "Early attentional modulation by alcohol-related cues in young binge drinkers: An event-related potentials study." *Clinical Neurophysiology* 123(5):925-936.
- Petit, G., C. Kornreich, P. Verbanck, and S. Campanella. 2013. "Gender differences in reactivity to alcohol cues in binge drinkers: A preliminary assessment of event-related potentials." *Psychiatry Research* 209(3):494-503.
- Pettigrew, S., M. Roberts, M. Pescud, K. Chapman, P. Quester, and C. Miller. 2012. "The extent and nature of alcohol advertising on Australian television." *Drug and Alcohol Review* 31:797-802.
- Phua, J. and S. J. Ahn. 2014. "Explicating the 'like' on Facebook brand pages: The effect of intensity of Facebook use, number of overall 'likes', and number of friends' 'likes' on consumers' brand outcomes." *Journal of Marketing Communications*.

- Phua, J. and A. J. Ahn. 2016. "Explicating the 'like' on Facebook brand pages: The effect of intensity of Facebook use, number of overall 'likes', and number of friends' 'likes' on consumers' brand outcomes." *Journal of Marketing Communications* 22(5):544-559.
- Phua, J. and S. Tinkham. 2016. "Authenticity in Obesity Public Service Announcements: Influence of Spokesperson Type, Viewer Weight, and Source Credibility on Diet, Exercise, Information Seeking, and Electronic Word-of-Mouth Intentions." *Journal of Health Communication* 21(3):337-345.
- Pinsky, I., S. A. R. J. . El Jundi, M. Sanches, M. J. B. Zaleski, R. R. Laranjeira, and R. Caetano. 2010. "Exposure of adolescents and young adults to alcohol advertising in Brazil." *Journal of Public Affairs* 10:50-58.
- Pinsky, I. and M. T. Silva. 1999. "A frequency and content analysis of alcohol advertising on Brazilian television." *Journal of Studies on Alcohol* 60:394-399.
- Podnar, K. and P. Javernik. 2012. "The Effect of Word of Mouth on Consumers' Attitudes Toward Products and Their Purchase Probability." *Journal of Promotion Management* 18(2):145-168.
- Polander, E. and V. L. Shalin. 2013. "An analysis of narrative and figurative language within online alcoholism discussion forums." *International Journal of Mental Health Addiction* 11:458-473.
- Ponzio, A. and M. Mara. 2014. "Hearing something emotional influences memory for what was just seen: How arousal amplifies effects of competition in memory consolidation." *Emotion* 16(6):1137-1142.
- Portman Group. 2012. "Code of Practice on the Naming, Packaging and Promotion of Alcoholic Drinks: Fifth Edition." Retrieved July 11, 2016

(http://www.portmangroup.org.uk/docs/default-source/code-of-practice/7609_por02_code_of_practice_final.pdf).

- Powell, C. 2003. "The Delphi technique: Myths and realities." *Journal of Advanced Nursing* 41(4):376-382.
- Proctor, D. C., T. F. Babor, and Z. Xuan. 2005. "Effects of cautionary messages and vulnerability factors on viewers' perceptions of alcohol advertisements." *Journal of Studies on Alcohol* 66(5):648-657.
- Rajan, I., P. J. Naga Venkatesha Murthya, A. G. Ramakrishnan, B. N. Gangadhar, and N. Janakiramaiah. 1998. "Heart rate variability as an index of cue reactivity in alcoholics." *Biological Psychiatry* 43(7):544-546.
- Ramirez, J. J., P. M. Monti, and R. M. Colwill. 2015. "Alcohol-cue exposure effects on craving and attentional bias in underage college-student drinkers." *Psychology of Addictive Behaviors* 29(2):317-322.
- Rauniar, R., G. Rawski, J. Yang, and B. Johnson. 2014. "Technology acceptance model (TAM) and social media usage: an empirical study on Facebook." *Journal of Enterprise Information Management* 27(1):6-30.
- Rehm, J., C. Mathers, S. Popova, M. Thavorncharoensap, Y. Teerawattananon, and J. Patra. 2009. "Global burden of disease and injury and economic cost attributable to alcohol use and alcohol-use disorders." *The Lancet* 373(9682):2223-2233.
- Reichheld, F. F. 2003. "The one number you need to grow." *Harvard Business Review* 46-55.
- Retrieved July 8, 2016 (<https://hbr.org/2003/12/the-one-number-you-need-to-grow>).

- Reid, M. S., F. Flammino, A. Starosta, J. Palamar, and J. Franck. 2006. "Physiological and subjective responding to alcohol cue exposure in alcoholics and control subjects: evidence for appetitive responding." *Journal of Neural Transmission* 113(10):1519-1535.
- Reimer, T. and M. Benkenstein. 2016. "When good WOM hurts and bad WOM gains: The effect of untrustworthy online reviews." *Journal of Business Research* 69(12):5993-6001.
- Reinert, D. F. and J. P. Allen. 2007. "The alcohol use disorders identification test: an update of research findings." *Alcoholism: Clinical and Experimental Research* 31(2):185-199.
- Rhoades, E. and D. H. Jernigan. 2013. "Risky messages in alcohol advertising, 2003-2007: results from content analysis." *Journal of Adolescent Health* 52:116-121.
- Ridout, B. and A. Campbell. 2014. "Using Facebook to deliver a social norm intervention to reduce problem drinking at university." *Drug & Alcohol Review* 33(6):667-673.
- Ridout, B., A. Campbell, and L. Ellis. 2012. "'Off your Face(book)': Alcohol in online social identity construction and its relation to problem drinking in university students." *Drug & Alcohol Review* 31(1):20-26.
- Riggs, L., D. A. McQuiggan, A. K. Anderson, and J. D. Ryan. 2010. "Eye Movement Monitoring Reveals Differential Influences of Emotion on Memory." *Frontiers in Psychology* 1:205.
- Roberts, D. 2015. "Bud Light Will Remain NFL's Official Beer Until 2022." *Fortune*. Retrieved January 9, 2017 (<http://fortune.com/2015/11/04/bud-light-nfl-deal/>).
- Rock, A. J. and N. Kambouropoulos. 2009. "Does Altered State of Awareness Mediate the Relationship Between the Unusual Experiences Trait and Alcohol Cue-Reactivity?" *North American Journal of Psychology* 11(3):443-453.

- Rodriguez, L. M., D. Litt, C. Neighbors, and M. A. Lewis. 2016. "I'm a Social (Network) Drinker: Alcohol-Related Facebook Posts, Drinking Identity, and Alcohol Use." *Journal of Social & Clinical Psychology* 35(2):107-129.
- Rogers, A., H. Brooks, I. Vassilev, A. Kennedy, C. Blickem, and D. Reeves. 2014. "Why less may be more: a mixed methods study of the work and relatedness of 'weak ties' in supporting long-term condition self-management." *Implementation Science* 9:19.
- Rohsenow, D. J., P. M. Monti, A. V. Rubonis, A. D. Sirota, R. S. Niaura, S. M. Colby, S. M. Wunschel, and D. B. Abrams. 1994. "Cue reactivity as a predictor of drinking among male alcoholics." *Journal of Consulting and Clinical Psychology* 62(3):620-626.
- Ross, C. S., R. D. Brewer, and D. H. Jernigan. 2016. "The Potential Impact of a "No-Buy" List on Youth Exposure to Alcohol Advertising on Cable Television." *Journal of Studies on Alcohol and Drugs* 77:7-16.
- Ross, C. S., E. Maple, M. Siegel, W. DeJong, T. S. Naimi, Padon A. A., D. L. G. Borzekowski, and D. H. Jernigan. 2015. "The Relationship Between Population-Level Exposure to Alcohol Advertising on Television and Brand-Specific Consumption Among Underage Youth in the US." *Alcohol and Alcoholism* 50(3):358-364.
- Ross, C. S., E. Maple, M. Siegel, W. DeJong, T. S. Naimi, J. Ostroff, A. A. Padon, D. L. G. Borzekowski, and D. H. Jernigan. 2014. "The Relationship Between Brand-Specific Alcohol Advertising on Television and Brand-Specific Consumption Among Underage Youth." *Alcoholism: Clinical and Experimental Research* 38(8):2234-2242.
- Rozzell, B., C. W. Piercy, C. T. Carr, S. King, B. L. Lane, M. Torner, A. J. Johnson, and K. B. Wright. 2014. "Notification pending: Online social support from close and nonclose relational ties via Facebook." *Computers in Human Behavior* 38:272-280.

- SABMiller. 2014. "Policy on Commerical Communication." Retrieved July 11, 2016 (<http://www.sabmiller.com/docs/default-source/alcohol-policy/policy-on-commercial-communication-2014.pdf?sfvrsn=2>).
- Sabuhoro, J. B., B. Larue, and E. Larivière. 1997. "Advertising Expenditures and the Consumption of Alcoholic Beverages." *Journal of International Food & Agribusiness Marketing* 8(3):37-54.
- Sacks, J. J., K. R. Gonzales, E. E. Bouchery, L. E. Tomedi, and R. D. Brewer. 2015. "2010 National and State Costs of Excessive Alcohol Consumption." *American Journal of Preventive Medicine* 49(5):e73-e79.
- Salganik, M. J., P. S. Dodds, and D. J. Watts. 2006. "Experimental study of inequality and unpredictability in an artificial cultural market." *Science* 311(5762):854-856.
- Sancho, F. M., M. J. Miguel, and J. Aldás. 2011. "Factors influencing youth alcohol consumption intention; An approach from consumer socialization theory." *Journal of Social Marketing* 1(3):192-210.
- Sandes, F. S. and A. T. Urdan. 2013. "Electronic Word-of-Mouth Impacts on Consumer Behavior: Exploratory and Experimental Studies." *Journal of International Consumer Marketing* 25(3):181-197.
- Sashittal, H. C., R. Sriramachandramurthy, and M. Hodis. 2012. "Targeting college students on Facebook? How to stop wasting your money." *Business Horizons* 55:495-507.
- Saunders, B. and E. Yap. 1991. "Do our guardians need guarding? An examination of the Australian system of self-regulation of alcohol advertising." *Drug and Alcohol Review* 10:15-27.

- Saxena, A. and U. Khanna. 2013. "Advertising on social network sites: A structural equation modeling approach." *Vision: The Journal of Business Perspective* 17(1):17-25.
- Schacht, J. P., R. F. Anton, P. K. Randall, Li X., S. Henderson, and H. Myrick. 2011. "Stability of fMRI striatal response to alcohol cues: A hierarchical linear modeling approach." *NeuroImage* 56(1):61-68.
- Scharf, D. M., S. C. Martino, C. M. Setodji, B. L. Staplefoote, and W. G. Shadel. 2013. "Middle and high school students' exposure to alcohol- and smoking-related media: a pilot study using ecological momentary assessment." *Psychology of Addictive Behaviors* 27(4):1201-1206.
- Schmidt, S. R. and C. R. Schmidt. 2016. "The emotional carryover effect in memory for words." *Memory* 24(7):916-938.
- Schneider, M. 2015. "The Most-Watched TV Shows of 2015: Here Are the Episodes and Telecasts That Had the Most Viewers." TV Insider. Retrieved July 6, 2016 (<http://www.tvinsider.com/article/62864/most-watched-tv-shows-2015-ratings/>).
- Schultz, E. J. 2013. "How does A-B InBev measure Facebook success?" *AdvertisingAge*, October 8. Retrieved June 29, 2016 (<http://adage.com/article/digital/a-b-inbev-measure-facebook-success/244526/>).
- Schulze, D. and B. T. Jones. 1999. "The effects of alcohol cues and an alcohol priming dose on a multi-factorial measure of subjective cue reactivity in social drinkers." *Psychopharmacology* 145(4):452-454.
- Schulze, D. and B. T. Jones. 2000. "Desire for alcohol and outcome expectancies as measures of alcohol cue-reactivity." *Addiction* 95(7):1015-1020.

- Schumann, J. H., F. von Wangenheim, and N. Groene. 2014. "Targeted Online Advertising: Using Reciprocity Appeals to Increase Acceptance Among Users of Free Web Services." *Journal of Marketing* 78(1):59-75.
- Searle, R., D. Alston, and D. P. French. 2014. "Do UK television alcohol advertisements abide by the code of broadcast advertising rules regarding the portrayal of alcohol?" *Alcohol and Alcoholism* 49:472-478.
- See-To, E. W. K. and K. K. W. Ho. 2014. "Value co-creation and purchase intention in social network sites: The role of electronic Word-of-Mouth and trust – A theoretical analysis." *Computers in Human Behavior* 31:182-189.
- Siegel, M., W. DeJong, D. Cioffi, L. Leon-Chi, T. S. Naimi, A. A. Padon, D. H. Jernigan, and Z. Xuan. 2016. "Do alcohol advertisements for brands popular among underage drinkers have greater appeal among youth and young adults?" *Substance Abuse* 37(1):222-229.
- Siegel, M., C. S. Ross, A. B. Albers, W. DeJong, C. King III, T. S. Naimi, and D. H. Jernigan. 2016. "The relationship between exposure to brand-specific alcohol advertising and brand-specific consumption among underage drinkers – United States, 2011–2012." *The American Journal of Drug and Alcohol Abuse* 42(1):4-14.
- Simons, D. J. and C. F. Chabris. 2012. "Common (Mis)Beliefs about Memory: A Replication and Comparison of Telephone and Mechanical Turk Survey Methods." *PLoS One* 7(12):e51876.
- Sjoerds, Z., W. van den Brink, A. T. Beekman, B. W. Penninx, and D. J. Veltman. 2014. "Cue Reactivity Is Associated with Duration and Severity of Alcohol Dependence: An fMRI Study." *PLoS One* 9(1):e84560.

- Smith, G. S., C. C. Branas, and T. R. Miller. 1999. "Fatal nontraffic injuries involving alcohol: a metaanalysis." *Annals of Emergency Medicine* 33(6):659-668.
- Smith, K. C., S. Cukier, and D. H. Jernigan. 2014. "Regulating alcohol advertising: content analysis of the adequacy of federal and self-regulation of magazine advertisements, 2008-2010." *American Journal of Public Health* 104:1901-1911.
- Smith, L. A. and D. R. Foxcroft. 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.
- Snyder, L. B., F. F. Milici, M. Slater, H. Sun, and Y. Strizhakova. 2006. "Effects of alcohol advertising exposure on drinking among youth." *Archives of Pediatrics & Adolescent Medicine* 160(1):18-24.
- Sohn, D. 2009. "Disentangling the Effects of Social Network Density on Electronic Word-of-Mouth (eWOM) Intention." *Journal of Computer-Mediated Communication* 14(2):352-367.
- Stacy, A. W., J. B. Zogg, J. B. Unger, and C. W. Dent. 2004. "Exposure to televised alcohol ads and subsequent adolescent alcohol use." *American Journal of Health Behavior* 28(6):498-509.
- Stahre, M., J. Roeber, D. Kanny, R. D. Brewer, and X. Zhang. 2014. "Contribution of excessive alcohol consumption to deaths and years of potential life lost in the United States." *Preventing Chronic Disease* 11:130293.
- Staiger, P. K. and J. M. White. 1991. "Cue reactivity in alcohol abusers: Stimulus specificity and extinction of the responses." *Addictive Behaviors* 16(5):211-221.

- Stasiewicz, P. R., T. H. Brandon, and C. M. Bradizza. 2007. "Effects of extinction context and retrieval cues on renewal of alcohol-cue reactivity among alcohol-dependent outpatients." *Psychology of Addictive Behaviors* 21(2):244-248.
- Statista. 2015. "Statistics and facts about Facebook." Retrieved July 12, 2016 (<http://www.statista.com/topics/751/facebook/>).
- Statista. 2015. "Statistics and facts about Instagram." Retrieved July 12, 2015 (<http://www.statista.com/topics/1882/instagram/>).
- Statista. 2015. "Statistics and facts about Twitter." Retrieved July 12, 2016 (<http://www.statista.com/topics/737/twitter/>).
- Statista. 2016. "Number of social network users worldwide from 2010 to 2019 (in billions)." Retrieved July 12, 2016 (<http://www.statista.com/statistics/278414/number-of-worldwide-social-network-users/>).
- Statista. 2016. "Percentage of U.S. internet users who use selected social networks as of April 2015." Retrieved July 13, 2016 (<http://www.statista.com/statistics/246230/share-of-us-internet-users-who-use-selected-social-networks/>).
- Statista. 2016. "Statistics and facts about YouTube." Retrieved July 12, 2016 (<http://www.statista.com/topics/2019/youtube/>).
- Statistia. 2016. "Advertising spending of the beer, wine and liquor industry in the United States in 2013, by medium (in thousand U.S. dollars)." Retrieved July 12, 2016 (<http://www.statista.com/statistics/245318/advertising-spending-of-the-alcohol-industry-in-the-us-by-medium/>).
- Steidl, S., F. Razik, and A. K. Anderson. 2011. "Emotion enhanced retention of cognitive skill learning." *Emotion* 11(1):12-19.

- Sterling, G. 2013. "YouTube To Make \$5.6 Billion In Global Ad Revenue This Year." Marketing Land. Retrieved May 18, 2016 (<http://marketingland.com/youtube-to-make-5-6-billion-in-global-ad-revenue-this-year-67809>).
- Stoddard, S. A., J. A. Bauermeister, D. Gordon-Messer, M. Johns, and M. A. Zimmerman. 2012. "Permissive Norms and Young Adults' Alcohol and Marijuana Use: The Role of Online Communities." *Journal of Studies on Alcohol and Drugs* 73(6):968-975.
- Storkmark, K. M., N. P. Field, K. Hugdahl, and M. Horowitz. 1997. "Selective processing of visual alcohol cues in abstinent alcoholics: An approach-avoidance conflict?" *Addictive Behaviors* 22(4):509-519.
- Strickland, D. E. 1983. "Advertising Exposure, alcohol consumption and misuse of alcohol." Pp. 201-222 in *Economics and Alcohol: Consumption and controls*. New York, NY: Gardner Press.
- Taemin, K. and K. Okhyun. 2016. "Self- and Social Motivation to Interact with a Brand on Facebook: The Moderating Roles of Self-Expression and Brand Engagement in a Student Sample." *Cyberpsychology, Behavior, and Social Networking* 19(5):328-334.
- Talmi, D. and L. M. McGarry. 2012. "Accounting for immediate emotional memory enhancement." *Journal of Memory and Language* 66(1):93-108.
- Talmi, D., M. Ziegler, J. Hawksworth, S. Lalani, C. P. Herman, and M. Moscovitch. 2013. "Emotional stimuli exert parallel effects on attention and memory." *Cognition and Emotion* 27(3):530-538.
- Tanksi, S. E., A. C. McClure, Z. Li, K. Jackson, M. Morgenstern, Z. Li, and J. D. Sargent. 2015. "Cued Recall of Alcohol Advertising on Television and Underage Drinking Behavior." *JAMA Pediatrics* 169(3):264-271.

- Tan, W. J., C. L. Kwek, and Z. Li. 2013. "The antecedents of effectiveness interactive advertising in the social media." *International Business Research* 6(3):88-99.
- Tapert, S. F., G. G. Brown, M. V. Baratta, and S. A. Brown. 2004. "fMRI BOLD response to alcohol stimuli in alcohol dependent young women." *Addictive Behaviors* 29(1):33-50.
- Taylor, D. G., J. E. Lewin, and D. Strutton. 2011. "Friends, Fans, and Followers: Do Ads Work on Social Networks?" *Journal of Advertising Research* 51(1):258-275.
- Thomsen, S. R. and D. Rekve. 2003. "The Influence of Religiosity on Reaction to Alcohol Advertisements and Current Drinking Among Seventh and Eighth Graders." *Journal of Media and Religion* 2(2):93-107.
- Tiffany, S. T. 1995. "Potential functions of classical conditioning in drug addiction." Pp. 47-71 in *Addictive Behavior: cue exposure theory and practice*. Chichester: John Wiley & Sons.
- Toyota, H. 2011. "EFFECTS ON INCIDENTAL MEMORY OF AFFECTIVE TONE IN ASSOCIATED PAST AND FUTURE EPISODES: INFLUENCE OF EMOTIONAL INTELLIGENCE." *Perceptual and Motor Skills* 112(1):322-330.
- U. S. Census Bureau. 2016. "American Community Survey (ACS) Data." Retrieved January 10, 2017 (<http://www.census.gov/programs-surveys/acs/data.html>).
- U.S. Beer Institute. 2015. "Beer Institute Advertising and Marketing Code." Retrieved July 11, 2016 (<http://www.beerinstitute.org/assets/uploads/general-upload/2015-Beer-Ad-Code-Brochure.pdf>).
- U.S. Department of Health and Human Services. 2007. "The Surgeon General's Call to Action to Prevent and Reduce Underage Drinking." Rockville, MD. Retrieved September 15, 2016 (http://www.ncbi.nlm.nih.gov/books/NBK44360/pdf/Bookshelf_NBK44360.pdf).

- Unwin, T. 1992. "Images of alcohol: Perceptions and the influence of advertising." *Journal of Wine Research* 3(3):205-229.
- Uzunoglu, E. and B. Öksüza. 2014. "New opportunities in social media for ad-restricted alcohol products: The case of 'Yeni Rakı'." *Journal of Marketing Communications* 20(4):270-290.
- Vendrame, A., I. Pinsky, R. Faria, and R. Silva. 2009. "Apreciação de propagandas de cerveja por adolescentes: relações com a exposição prévia às mesmas e o consumo de álcool | Brazilian teenagers and beer advertising: relationship between exposure, positive response, and alcohol consumption." *Cadernos de Saúde Pública* 25(2):359-365.
- Vendrame, A., I. Pinsky, R. S. e Silva, and T. Babor. 2010. "Assessment of self-regulatory code violations in Brazilian television beer advertisements." *Journal of Studies on Alcohol and Drugs* 71:445-451.
- Vendrame, A., R. Silva, Z. Xuan, R. Sparks, J. Noel, and I. Pinsky. 2015. "Self-Regulation of Beer Advertising: A Comparative Analysis of Perceived Violations by Adolescents and Experts." *Alcohol and Alcoholism* 50:602-607.
- Verkhovna Rada 1996. "Law of Ukraine on Advertising." in *Pub. L. No. 271/96-VR*.
- Versace, F., M. M. Bradlet, and P. J. Lang. 2010. "Memory and event-related potentials for rapidly presented emotional pictures." *Experimental Brain Research* 205(2):223-233.
- Viljoen, K. L., L. Dube, and T. Murisi. 2016. "Facebook versus Twitter: Which one is more credible in a South African context?" *South African Journal of Information Management* 18(1):1-7.
- Walitzer, K. S. and K. J. Sher. 1999. "Alcohol cue reactivity and ad lib drinking in young men at risk for alcoholism." *Addictive Behaviors* 15(1):29-46.

- Walker, A. and R. D'Onofrio. 2015. "Super Bowl XLIX on Facebook." Facebook Media.
Retrieved July 6, 2016 (<https://media.fb.com/2015/02/02/super-bowl-xlix-on-facebook/>).
- Wang, T., R. K.-J. Yeh, C. Chen, and Z. Tsydypov. 2016. "What drives electronic word-of-mouth on social networking sites? Perspectives of social capital and self-determination." *Telematics and Informatics* 33(4):1034-1047.
- WARC. 2013. "AB InBev taps social media." November 27. Retrieved June 29, 2016 (http://www.warc.com/LatestNews/News/AB_InBev_taps_social_media.news?ID=32257).
- Watts, S., L. G. Buratto, E. V. Brotherhood, G. E. Barnacle, and A. Schaefer. 2014. "The neural fate of neutral information in emotion-enhanced memory." *Psychophysiology* 51(7):673-684.
- Wechsler, H., A. Davenport, G. Dowdall, B. Moeykens, and S. Castillo. 1994. "Health and behavioral consequences of binge drinking in college." *JAMA* 272(21):1672-1677.
- Weiss, S. and M. Moore. 1990. "Cultural differences in the perception of magazine alcohol advertisements by Israeli Jewish, Moslem, Druze and Christian high school students." *Drug and Alcohol Dependence* 26(2):209-215.
- Westberg, K., C. Stavros, A. Smith, G. Munro, and K. Argus. 2015. "Exploring the use of sport-linked alcohol marketing via social media." Retrieved July 12, 2016 (<http://wsmconference.com/wp-content/uploads/2014/04/Kate-Westberg.pdf>).
- Westgate, E. C., C. Neighbors, H. Heppner, S. Jahn, and K. P. Lindgren. 2014. "'I will take a shot for every 'like' I get on this status': posting alcohol-related Facebook content is linked to drinking outcomes." *Journal of Studies on Alcohol and Drugs* 75(3):390-398.
- Weymar, M., M. M. Bradley, N. El-Hinnawi, and P. J. Lang. 2013. "Explicit and spontaneous retrieval of emotional scenes: Electrophysiological correlates." *Emotion* 13(5):981-988.

- Whitehill, J. M., M. A. Pumper, and M. A. Moreno. 2015. "Emerging adults' use of alcohol and social networking sites during a large street festival: A real-time interview study." *Substance Abuse Treatment, Prevention, and Policy* 10:21.
- Wilcox, G. B., K. K. Kim, and H. M. Schultz. 2012. "Liquor advertising and consumption in the United States: 1971-2008." *International Journal of Advertising* 31(4):819-834.
- Wine Institute. 2011. "Code of Advertising Standards." Retrieved July 11, 2016 (<http://www.wineinstitute.org/initiatives/issuesandpolicy/adcode/details>).
- Winpenny, E. M., T. M. Marteau, and E. Nolte. 2014. "Exposure of Children and Adolescents to Alcohol Marketing on Social Media Websites." *Alcohol and Alcoholism* 49(2):154-159.
- Witteman, J., H. Post, M. Tarvainen, A. de Bruijn, S. Perna Ede, J. G. Ramaekers, and R. W. Wiers. 2015. "Cue reactivity and its relation to craving and relapse in alcohol dependence: a combined laboratory and field study." *Psychopharmacology* 232(20):3685-3696.
- Wolburg, J. M. and O. Venger. 2009. "Regulating sin across cultures: A comparison of alcohol ads in Ukrainian and American magazines." *Journal of Advertising* 38:15-37.
- Wook Ha, Y, M.-C. Park, and E. Lee. 2014. "A framework for mobile SNS advertising effectiveness: user perceptions and behaviour perspective." *Behaviour & Information Technology* 33(12):1333-1346.
- Workman, J. E. 2003. "Alcohol Promotional Clothing Items and Alcohol Use by Underage Consumers." *Family and Consumer Sciences Research Journal* 31(3):331-354.
- Wrase, J., S.M. Grüsser, S. Klein, C. Diener, D. Hermann, H. Flor, K. Mann, D.F. Braus, and A. Heinz. 2002. "Development of alcohol-associated cues and cue-induced brain activation in alcoholics." *European Psychiatry* 17(5):287-291.

- Wright, L. L., L. E. Squires, T. M. Goodness, S. A. Maisto, and T. P. Palfai. 2013. "Effects of alcohol cues and alcohol intoxication on drug use expectancies among men who have sex with men." *Addictive Behaviors* 38(7):2317-2320.
- Wu, P. F. 2013. "In Search of Negativity Bias: An Empirical Study of Perceived Helpfulness of Online Reviews." *Psychology & Marketing* 30(11):971-984.
- Wu, L. 2016. "Understanding the Impact of Media Engagement on the Perceived Value and Acceptance of Advertising Within Mobile Social Networks." *Journal of Interactive Advertising* 16(1):59-73.
- Wyllie, A., J. Zhang, and S. Casswell. 1998. "Positive responses to televised beer advertisements associated with drinking and problems reported by 18 to 29-year-olds." *Addiction* 93(5):749-760.
- Xu, B., L. Liu, and W. You. 2011. "Importance of tie strengths in the prisoner's dilemma game on social networks." *Physics Letters A* 375(24):2269-2273.
- Yaakop, A., M. M. Anuar, and K. Omar. 2013. "Like It or Not: Issue of Credibility in Facebook Advertising." *Asian Social Science* 9(3):154-163.
- Yang, H. and H. Liu. 2014. "Prior negative experience of online disclosure, privacy concerns, and regulatory support in Chinese social media." *Chinese Journal of Communication* 7(1):40-59.
- Yan, Q., S. Wu, L. Wang, P. Wu, H. Chen, and G. Wei. 2016. "E-WOM from e-commerce websites and social media: Which will consumers adopt?" *Electronic Commerce Research and Applications* 17:62-73.

- Yegiyan, N. S. 2015. "Explicating the emotion spillover effect: At the intersection of motivational activation, resource allocation, and consolidation." *Journal of Media Psychology: Theories, Methods, and Applications* 27(3):134-145.
- Yick, Y. Y., L. G. Buratto, and A. Schaefer. 2016. "Variations in prestimulus neural activity predict the emotion-enhanced memory effect." *NeuroReport* 27(11):864-868.
- YLE. 2014. "Government imposes further restrictions on alcohol advertising." *Uutiset*, February 27. Retrieved July 11, 2016 (http://yle.fi/uutiset/government_imposes_further_restrictions_on_alcohol_advertising/7112320).
- Zack, M., T. Toneatto, and C. M. MacLeod. 1999. "Implicit activation of alcohol concepts by negative affective cues distinguishes between problem drinkers with high and low psychiatric distress." *Journal of Abnormal Psychology* 108(3):518-531.
- Zeng, F., L. Huang, and W. Dou. 2009. "Social Factors in User Perceptions and Responses to Advertising in Online Social Networking Communities." *Journal of Interactive Advertising* 10(1):1-13.
- Zerhouni, O., L. Bègue, A. A. Duke, and V. Flaudias. 2016. "Dynamic Exposure to Alcohol Advertising in a Sports Context Influences Implicit Attitudes." *Alcoholism: Clinical and Experimental Research* 40(2):422-428.
- Zhang, L. and T.-Q. Peng. 2015. "Breadth, depth, and speed: diffusion of advertising messages on microblogging sites." *Internet Research* 25(3):453-470.
- Zhao, J., J. Wu, X. Feng, H. Xiong, and K. Xu. 2012. "Information propagation in online social networks: a tie-strength perspective." *Knowledge and Information Systems* 32(3):589-608.

Zwarun, L. and K. M. Farrar. 2005. "Doing what they say, saying what they mean: Self-regulatory compliance and depictions of drinking in alcohol commercials in televised sports." *Mass Communication and Society* 8:347-371.

APPENDICES

Appendix 1 – Ad Rating Questions Mapped onto IARD’s Guiding Principles

Rating Question	Relevant Guideline from the Guiding Principles (GP)
This ad shows situations where people are drinking an alcoholic beverage excessively, or otherwise encourages immoderate consumption.	(GP 2.1) Should portray only moderate and responsible consumption by people of legal age to consume alcohol beverages
This ad shows situations where people are drinking alcohol irresponsibly.	(GP 2.1) Should portray only moderate and responsible consumption by people of legal age to consume alcohol beverages
This ad suggests that being drunk or intoxicated is acceptable.	(GP 2.1) Should portray only moderate and responsible consumption by people of legal age to consume alcohol beverages
This ad uses symbols, language, music, gestures, or cartoon characters that are associated with or are intended to appeal primarily to persons below legal purchase age.	(GP 4.1) Should avoid the use of themes, icons, music, games, or characters that appeal primarily to minors
This ad shows traditional heroes or current celebrities, such as entertainment figures and athletes, who appeal primarily to people below legal purchase age.	(GP 4.1) Should avoid the use of themes, icons, music, games, or characters that appeal primarily to minors
The ad associates performance success with drinking the alcohol product.	(GP 5.3) Should not suggest that alcohol beverages can enhance physical, sporting, or mental ability
This ad conveys the message that drinking is linked to being more energetic or dynamic.	(GP 3.2) Should not present alcohol as a stimulant, sedative, or tranquilizer
This ad conveys the message that alcohol improves femininity /masculinity, and/ or improves the capacity to be more attractive to others.	(GP 5.5) Should not present alcohol beverages as a means of removing social or sexual inhibitions, achieving sexual success, or making an individual more sexually attractive
This ad suggests that drinking leads to an exciting adventurous life.	(GP 5.4) Should not present alcohol beverages as necessary for social success or acceptance
This ad suggests that drinking has a positive emotional benefit, such as reducing anxiety or depression.	(GP 3.1) Should not suggest that alcohol beverages can prevent, treat, or cure illness or resolve personal problems
This ad conveys the message that drinking leads to having a more independent/ individualistic or cool personality.	(GP 5.4) Should not present alcohol beverages as necessary for social success or acceptance
This ad suggests that drinking will help a person to relax or relieve stress.	(GP 3.1) Should not suggest that alcohol beverages can prevent, treat, or cure illness or resolve personal problems

Rating Question	Relevant Guideline from the Guiding Principles (GP)
This ad portrays the alcohol product as key to sexual success.	(GP 5.5) Should not present alcohol beverages as a means of removing social or sexual inhibitions, achieving sexual success, or making an individual more sexually attractive
This ad associates the alcohol product with removing social and/ or sexual inhibitions.	(GP 5.5) Should not present alcohol beverages as a means of removing social or sexual inhibitions, achieving sexual success, or making an individual more sexually attractive
This ad conveys a message that drinking is associated with being more popular or accepted.	(GP 5.4) Should not present alcohol beverages as necessary for social success or acceptance
This ad associates improvement of social status with drinking the alcohol product.	(GP 5.4) Should not present alcohol beverages as necessary for social success or acceptance
This ad suggests that drinking will help to alleviate boredom or loneliness.	(GP 5.4) Should not present alcohol beverages as necessary for social success or acceptance
This ad associates solving social, personal or physical problems with drinking the alcohol product.	(GP 3.1) Should not suggest that alcohol beverages can prevent, treat, or cure illness or resolve personal problems
This ad associates social, professional, mental, educational, athletic or financial success with drinking the alcohol product.	(GP 5.3) Should not suggest that alcohol beverages can enhance physical, sporting, or mental ability
This ad shows drunk driving, or suggests that drunk driving is acceptable.	(GP 3.4) Should not portray or encourage drinking prior to or during activities requiring sobriety or a high degree of skill or precision, such as controlling a motor vehicle or operating machinery
This ad shows or suggests the use of an alcohol product before or during activities requiring sobriety or a high degree of alertness or coordination, such as driving an automobile, operating machinery, boats, working in a hazardous situation, playing sports, etc.	(GP 3.4) Should not portray or encourage drinking prior to or during activities requiring sobriety or a high degree of skill or precision, such as controlling a motor vehicle or operating machinery
This ad shows one or more people in a state of drunkenness.	(GP 2.1) Should portray only moderate and responsible consumption by people of legal age to consume alcohol beverages
This ad suggests that it is acceptable for people to consume an alcoholic beverage to a point where they appear to lack control over their behavior, coordination, or speech.	(GP 2.1) Should portray only moderate and responsible consumption by people of legal age to consume alcohol beverages
This ad suggests drinking is associated with violent, aggressive, antisocial, and/ or hazardous behavior.	(GP 1.5) Should avoid any association with violent, aggressive, hazardous, illegal, or antisocial behavior

Rating Question	Relevant Guideline from the Guiding Principles (GP)
This ad gives the impression that the alcohol product has special or unique qualities, or that it has curative or therapeutic benefits.	(GP 3.1) Should not suggest that alcohol beverages can prevent, treat, or cure illness or resolve personal problems
This ad makes scientifically unsupported claims about the effect of an alcohol product on people's health.	(GP 3.1) Should not suggest that alcohol beverages can prevent, treat, or cure illness or resolve personal problems
This ad refers to the alcohol content of the advertised product directly or indirectly.	(GP 5.2) Should not present high alcohol strength as a principal basis of appeal
This ad shows illegal activity.	(GP 1.5) Should avoid any association with violent, aggressive, hazardous, illegal, or antisocial behavior
This ad misrepresents the alcohol product and is dishonest or untruthful.	(GP 1.1) Should be legal, decent, honest and truthful, and conform to accepted principles of fair competition and good business practice
The ad condones or trivializes excessive or irresponsible alcohol consumption.	(GP 2.2) Should avoid condoning or trivializing excessive or irresponsible consumption or intoxication
The ad portrays abstinence or moderate alcohol consumption in a negative way.	(GP 2.3) Should avoid portraying abstinence or moderate consumption in a negative way
The ad depicts or appears to be addressed to at-risk groups, such as pregnant women, women of childbearing age, people under legal purchase age, college students, ethnic minorities, alcoholics, or other vulnerable groups	(GP 3.3) Should not depict or be addressed to at-risk groups
This ad presents alcohol as a stimulant, sedative or tranquilizer.	(GP 3.2) Should not present alcohol beverages as a stimulant, sedative or tranquilizer
This ad uses themes, images, symbols, or portrayals likely to be considered offensive, derogatory or demeaning.	(GP 1.2) Prepared with a due sense of social responsibility, not using themes, images, symbols, or portrayals likely to be considered of offensive, derogatory, or demeaning
This ad is in conflict with generally accepted principles concerning respect for human dignity and integrity.	(GP 1.4) Respect human dignity and integrity
How old do you think the youngest person in this ad is?	(GP 4.2) avoid showing minors (or people likely to be perceived as minors) drinking alcohol beverages
How many drinks do you estimate this person is likely to consume in the situation shown in the ad?	(GP 2.1) portray only moderate and responsible consumption by people of legal age to consume alcohol beverages

Appendix 2 – Individual Scoring Criterion

For the individual scoring criterion, the Likert scale questions used in the compliance questionnaire are first coded such that Strongly Disagree = 1, Disagree = 2, Neither Disagree Nor Agree = 3, Agree = 4, and Strongly Agree = 5. The questions regarding the approximate age of the youngest actor/actress and the number of drinks perceived to be consumed are unaltered. Then, for each rater, each of the 37 questions is dichotomized. For the Likert scale questions, if a rater answered 4 (Agree) or 5 (Strongly Agree), the question is coded as being violated (= 1). If a rater answered 1 (Strongly Disagree), 2 (Disagree), or 3 (Neither Disagree Nor Agree), the question is coded as not being violated (= 0). For the approximately age of the youngest actor/actress, the question is coded as being violated (= 1) if a rater indicates the actor/actress is < 21 years old. If a rater indicates the youngest actor/actress is ≥ 21 , the question is coded as not being violated (= 0). For the number of drinks perceived to be consumed, the question is coded as being violated (= 1) if a rater indicates ≥ 5 drinks are perceived as being consumed. If a rater indicates that the number of drinks perceived to be consumed is < 4 drinks, the question is coded as not being violated (= 0).

After each question has been dichotomized, the questions are mapped to the appropriate sub-guidelines contained within ICAP's Guiding Principles (Appendix 1 – Ad Rating Questions Mapped onto IARD's Guiding Principles). Some sub-guidelines are mapped to multiple questions. Similarly, some questions are mapped to multiple sub-guidelines. If any question related to the same sub-guideline is coded as being violated (= 1), the sub-guideline is coded as being violated (= 1). For example, sub-guideline 5.3 ("Alcohol beverage marketing communications should not... suggest that alcohol beverages can enhance physical, sporting, or mental ability") is represented by 2 Likert scale questions ("The ad associates performance

success with drinking the alcohol product” and “This ad associates social, professional, mental, educational, athletic or financial success with drinking the alcohol product”). If either of these questions is coded as being violated (= 1), sub-guideline 5.3 will be coded as containing a violation (= 1).

Then, each sub-guideline is mapped to a guideline, according to the Guiding Principles (Appendix 1 – Ad Rating Questions Mapped onto IARD’s Guiding Principles; Figure 2). If any sub-guideline related to the same guideline is coded as being violated (= 1), the guideline is coded as being violated (= 1). For example, guideline 4 (“Minors”) contains 2 sub-guidelines (“Alcohol beverage marketing communications should... (SG 4.1) avoid the use of themes, icons, music, games, or characters that appeal primarily to minors”, and (SG 4.2) “avoid showing minors (or people likely to be perceived as minors) drinking alcohol beverages”). If either of these sub-guidelines is coded as containing a violation (= 1), the guideline 4 is coded as containing a violation (= 1). This procedure is performed for the ratings produced by each rater. If the responses for > 50% of the raters indicate that the same sub-guideline or guideline has been violated, then the ad is coded as containing a violation (= 1). If the responses for $\leq 50\%$ of the raters indicate that the same sub-guideline or guideline has been violated, the ad is coded as not containing a violation (= 0).

For the individual criterion, the unit of analysis at the beginning of the procedure is the number of expert raters. The unit of analysis at the end of the procedure is the number of ads.

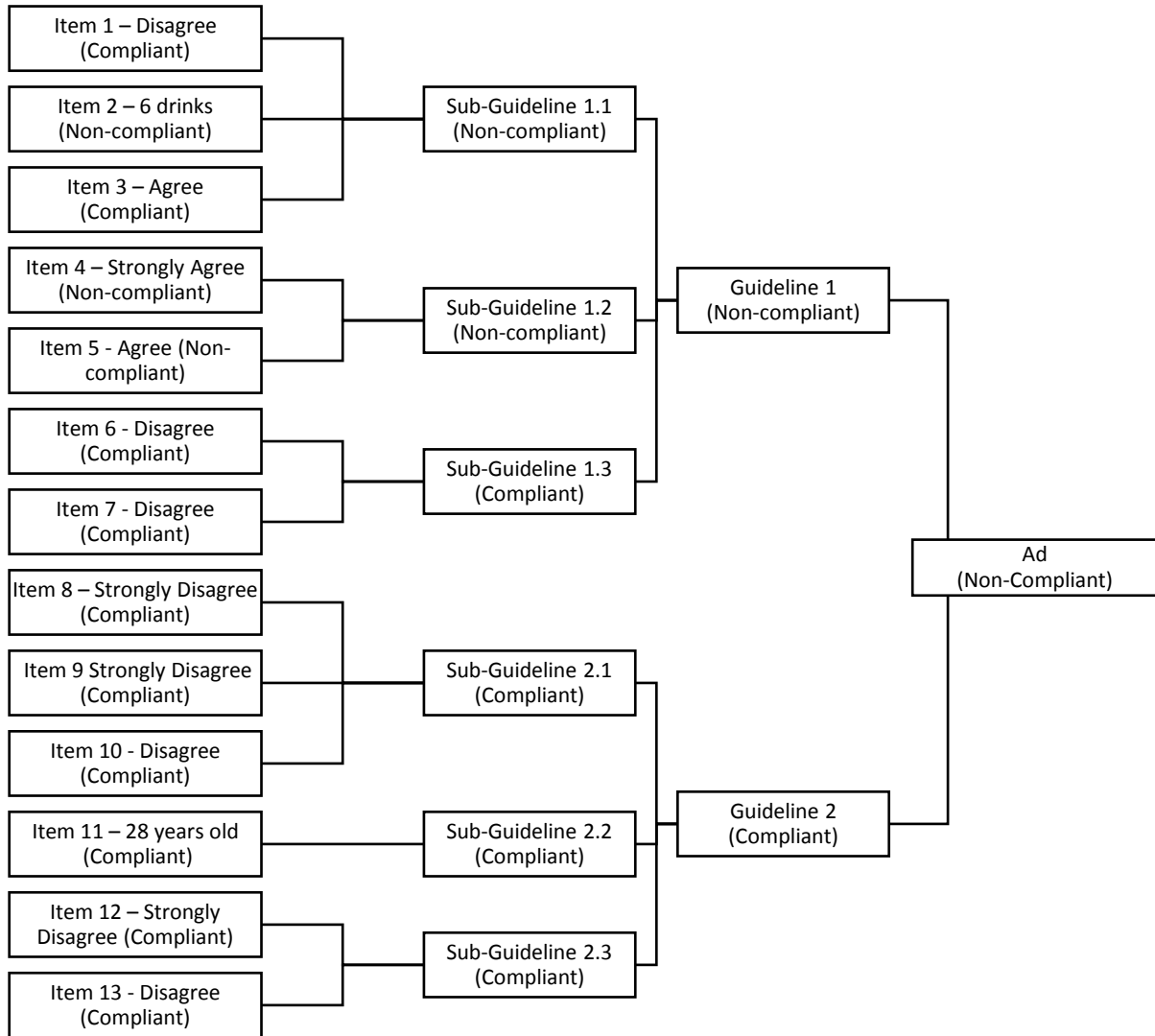


Figure 2. Hypothetical determination of a violation of a self-regulated alcohol advertising code.

Appendix 3 – Facebook Ads Used in Study 2

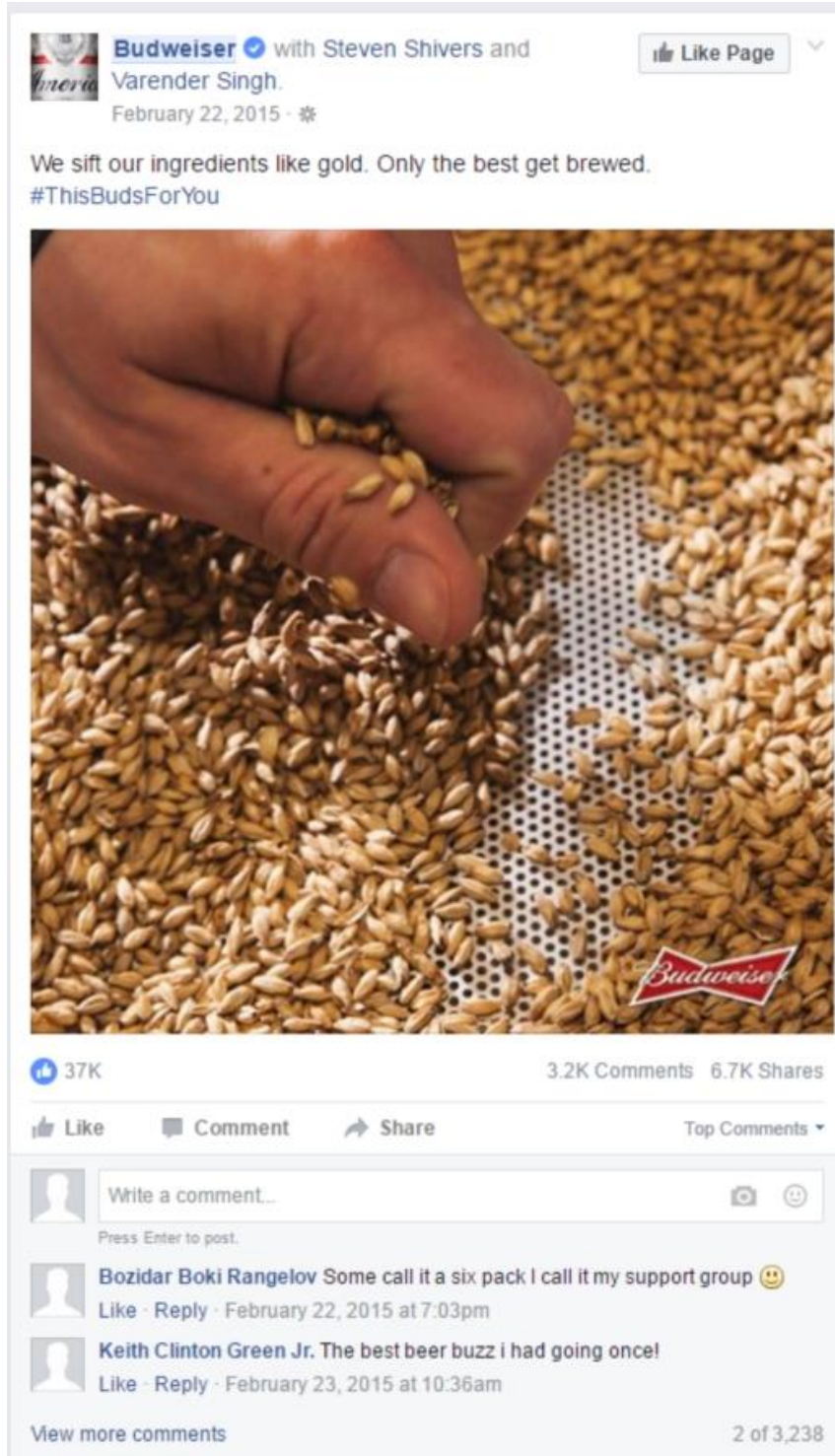


Figure 3. Compliant Budweiser ad with high user engagement and pro-drinking comments.



 **Budweiser** ✓ with Doug MacRay and 3 others.
February 25, 2015 · 🌟

Brewed for weeks so you can drink it in minutes. #ThisBudsForYou



27K 4.5K Comments 11K Shares

Like Comment Share Top Comments ▾

 Write a comment...  

Press Enter to post.

 **Nina Reyes** the perfect beer to drown out the now ex mother in law's bitching. Good stuff.
Like · Reply · February 26, 2015 at 8:08am

 **Shawn AG** Beeeeeeeer Is Gooooooood!!!! Yuuuuuum!!! LOL
Like · Reply · February 26, 2015 at 11:40am

View more comments 2 of 4,526

Figure 4. Non-compliant Budweiser ad with high user engagement and pro-drinking comments.



Figure 5. Compliant Bud Light ad with high user engagement and pro-drinking comments.

Bud Light ✓
January 18, 2015 · 🌐

When you're #UpForWhatever, doors open. #SuperBowl



47K · 2K Comments · 4.3K Shares

Like · Comment · Share · Top Comments ▾

Write a comment...  

Press Enter to post.

 **Michelle Castellano** He'll yea surrounds real good right now
Like · Reply · January 18, 2015 at 1:27pm

 **Susan Santistevan** Remember drinking those and dancing at the library on campus west?
Like · Reply · January 18, 2015 at 6:36pm

View more comments · 2 of 2,092

Figure 6. Non-compliant Bud Light ad with high user engagement and pro-drinking comments.

Budweiser with Steven Shivers and Varendra Singh.
February 22, 2015 · 🌟

We sift our ingredients like gold. Only the best get brewed.
#ThisBudsForYou



37K · 3.2K Comments · 6.7K Shares

Like · Comment · Share · Top Comments ▾

Write a comment...
Press Enter to post.

Cornelius Murray I lost a friend behind your product. U guys suck
Like · Reply · February 22, 2015 at 7:03pm

Carolyn Hannah I don't drink anymore!
Like · Reply · February 23, 2015 at 10:36am

View more comments · 2 of 3,238

Figure 7. Compliant Budweiser ad with high user engagement and anti-drinking comments.

Budweiser with Doug MacRay and 3 others.
February 25, 2015 · 🌟

Brewed for weeks so you can drink it in minutes. #ThisBudsForYou



27K · 4.5K Comments · 11K Shares

Like · Comment · Share · Top Comments ▾

Write a comment...
Press Enter to post.

Tim McBride It keeps emergency response teams employed and money circulating.
Like · Reply · February 26, 2015 at 8:08am

Nathaniel Holmes 2 years sober
Like · Reply · February 26, 2015 at 11:40am

View more comments · 2 of 4,526

Figure 8. Non-compliant Budweiser ad with high user engagement and anti-drinking comments.



Figure 9. Compliant Bud Light ad with high user engagement and anti-drinking comments.

Bud Light ✓
January 18, 2015 · 🌟

When you're #UpForWhatever, doors open. #SuperBowl



47K 2K Comments 4.3K Shares

Like Comment Share Top Comments ▾

Write a comment... 📷 😊

Press Enter to post.

Thomas Littlefield Akbar my butt! Nothing but idiots wanting to get hurt
Like · Reply · January 18, 2015 at 1:27pm

Gina Sierra Blaze I quit drinking four years ago Go me
Like · Reply · January 18, 2015 at 6:36pm

View more comments 2 of 2,092

Figure 10. Non-compliant Bud Light ad with high user engagement and anti-drinking comments.

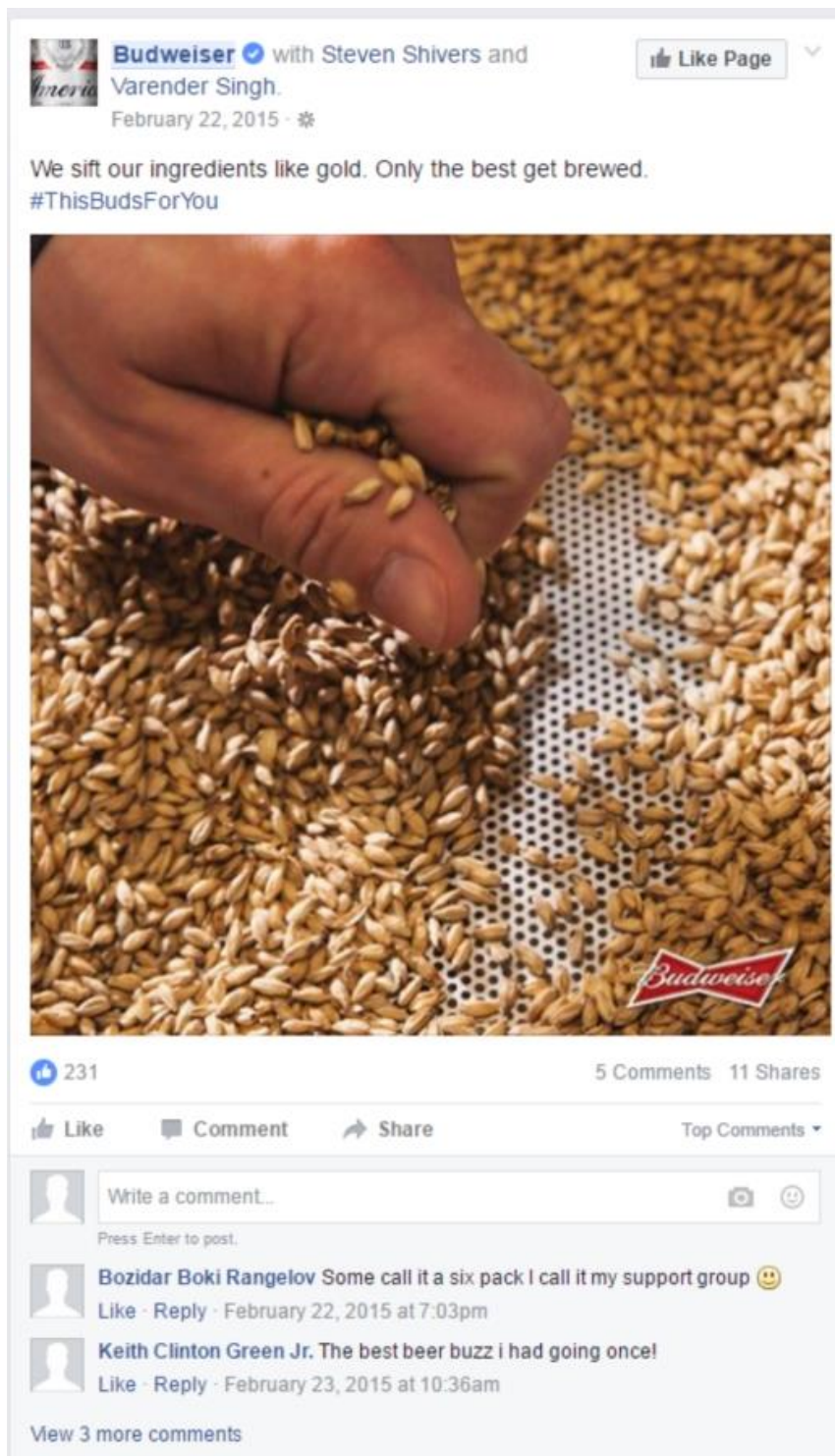


Figure 11. Compliant Budweiser ad with low user engagement and pro-drinking comments.



Figure 12. Non-compliant Budweiser ad with low user engagement and pro-drinking comments.



Figure 13. Compliant Bud Light ad with low user engagement and pro-drinking comments.



Figure 14. Non-compliant Bud Light ad with low user engagement and pro-drinking comments.



Figure 15. Compliant Budweiser ad with low user engagement and anti-drinking comments.

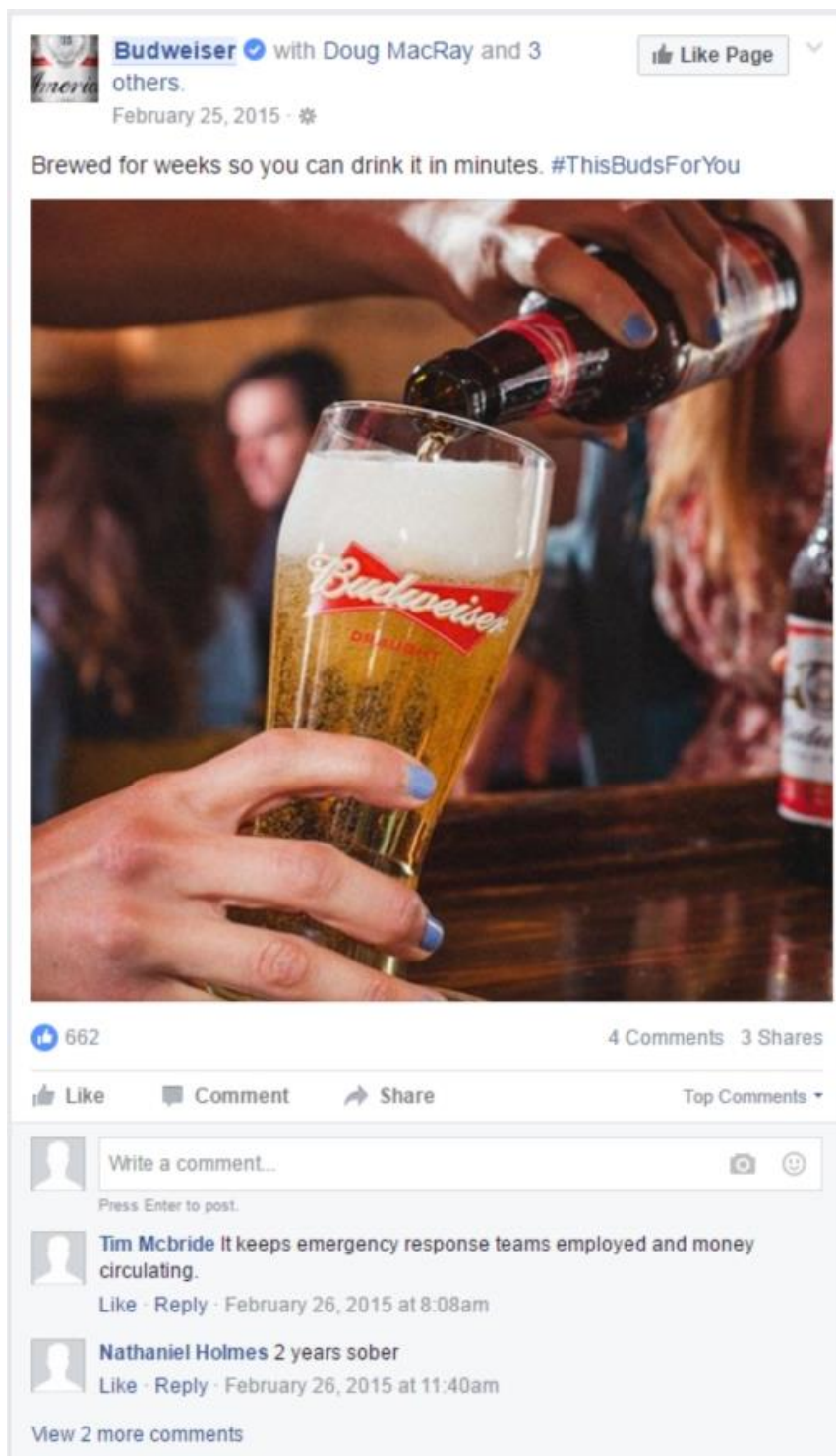


Figure 16. Non-compliant Budweiser ad with low user engagement and anti-drinking comments.



Figure 17. Compliant Bud Light ad with low user engagement and anti-drinking comments.



Figure 18. Non-compliant Bud Light ad with low user-engagement and anti-drinking comments.

Appendix 4 – Study 2 Questionnaire

View the Facebook post below and answer the following questions with regards to this, and only this ad. Additionally, please do not include self-identifying information anywhere on this questionnaire.

Once you have answered each question, please click the “Next Page” button at the bottom of the screen to continue on to the next section of the survey.

[Facebook post was inserted here]

For questions 1 to 17, you will see a pair of descriptive words. For each pair, position the bar nearest the response that you feel best describes the Facebook post you just saw.

1)	Not knowledgeable	_____	_____	Knowledgeable
2)	Not trustworthy	_____	_____	Trustworthy
3)	Is stimulating	_____	_____	Is not stimulating
4)	Rational	_____	_____	Not rational
5)	Is stirring	_____	_____	Is not stirring
6)	Unbelievable	_____	_____	Believable
7)	Does not reach out to me	_____	_____	Reaches out to me
8)	Not informative	_____	_____	Informative
9)	Touches me emotionally	_____	_____	Does not touch me emotionally
10)	Logical	_____	_____	Not logical
11)	Reliable	_____	_____	Unreliable
12)	Is not moving	_____	_____	Is moving
13)	Dependable	_____	_____	Undependable
14)	Affects my feelings	_____	_____	Does not affect my feelings
15)	Credible	_____	_____	Not credible
16)	Deals with facts	_____	_____	Does not deal with facts
17)	Is not exciting	_____	_____	Is exciting

For question 18, please read the question and select the appropriate response.

18) Do you think this Facebook post would increase or decrease the desire to drink any alcohol in an individual like yourself?

*Definitely
Decrease*

☐

Decrease

☐

*Neither Increase
nor Decrease*

☐

Increase

☐

*Definitely
Increase*

☐

For questions 19 and 20, please indicate your level of agreement with each of the following statements.

19) I would “Like” this Facebook post.

*Strongly
disagree*

☐

Disagree

☐

*Neither Agree
nor Disagree*

☐

Agree

☐

*Strongly
Agree*

☐

20) I would “Share” this Facebook post with my Friend network.

*Strongly
disagree*

☐

Disagree

☐

*Neither Agree
nor Disagree*

☐

Agree

☐

*Strongly
Agree*

☐

[Note: Questions 1-20 will be answered for each of the 4 Facebook posts that were viewed in Study 2.]

[Note: The remaining questions will only be asked 1 time.]

The following questions will ask you about your demographic background. Once you have answered each question, please click the “Next Page” button at the bottom of the screen to continue on to the next section of the survey.

1) What is your age? _____

2) What is your gender?

- ☐ Male
- ☐ Female

3) What is your race? [Select all that apply]

- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Black or African American
- ☐ Caucasian
- ☐ Native Hawaiian or Other Pacific Islander

- ☐ Some other race

4) Are you of Hispanic, Latino, or Spanish origin?

- ☐ No, not of Hispanic, Latino, or Spanish origin
☐ Yes, of Hispanic, Latino, or Spanish origin

5) What is your marital status?

- ☐ Single, never married
☐ Married, or domestic partnership
☐ Widowed
☐ Divorced
☐ Separated

6) What is your total household income?

- ☐ Less than \$10,000
☐ \$10,000 to \$19,999
☐ \$20,000 to \$29,999
☐ \$30,000 to \$39,999
☐ \$40,000 to \$49,999
☐ \$50,000 to \$59,999
☐ \$60,000 to \$69,999
☐ \$70,000 to \$79,999
☐ \$80,000 to \$89,999
☐ \$90,000 to \$99,999
☐ \$100,000 to \$149,999
☐ \$150,000 or more

The following questions ask about your use of social media. Once you have answered each question, please click the “Next Page” button at the bottom of the screen to continue on to the next section of the survey.

For questions 1 to 27, please indicate whether you agree or disagree with each of the following statements.

	<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Neither Agree nor Disagree</i>	<i>Agree</i>	<i>Strongly Agree</i>
1) I find Facebook easy to use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) I trust Facebook with my information on my profile.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) Facebook provides clear instructions for posting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) People from my work are on Facebook.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5) I feel safe in my postings with Facebook.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6) Using Facebook makes it easier to stay informed with my friends and family.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7) Images and videos can be easily downloaded or uploaded on Facebook.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8) I will continue to use Facebook for social networking.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9) It is easy to become skillful at using Facebook.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10) Using Facebook enables me to get re-connected with people that matter to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11) Interaction with Facebook is clear and understandable.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12) Facebook provides security for my postings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13) Facebook is popular among my friends.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14) Facebook is flexible to interact with.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15) Using Facebook makes it easier to stay in touch.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16) I find Facebook useful in my personal life.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17) Facebook provides security for my profile.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18) I intend to use Facebook to get reconnected with people that matter to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19) I find it easy to get Facebook to do what I want to do.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20) Using Facebook enhances my effectiveness to stay in touch with others.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21) Applications and capabilities of Facebook meet my social networking needs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22) A good number of my friends are on Facebook.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23) I intend to use Facebook for communicating with others.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

For a social networking website,
Facebook features and applications are:

- | | | | | | |
|----------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 24) Delightful | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 25) Exciting | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 26) Thrilling | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 27) Fun | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

For questions 28-30, please select the appropriate response.

28) How often per week do you visit your Facebook account?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <i>Never</i> | <i>Rarely</i> | <i>Occasionally</i> | <i>Often</i> | <i>Frequently</i> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

29) How many hours do you use your Facebook account every week?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <i>0 to 2 hours</i> | <i>2 to 4 hours</i> | <i>4 to 6 hours</i> | <i>6 to 8 hours</i> | <i>More than 8 hours</i> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

The following questions ask about your alcohol use history. Please select the answer that is correct for you. Once you have answered each question, please click the “Next Page” button at the bottom of the screen to continue on to the next section of the survey.

1) How often do you have a drink containing alcohol?

- | | | | | |
|--------------------------|--------------------------|-----------------------------|------------------------------|-------------------------------|
| <i>Never</i> | <i>Monthly or less</i> | <i>2 to 4 times a month</i> | <i>2 to 3 times per week</i> | <i>4 or more times a week</i> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2) How many drinks containing alcohol do you have on a typical day when you are drinking?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <i>1 or 2</i> | <i>3 or 4</i> | <i>5 or 6</i> | <i>7 to 9</i> | <i>10 or more</i> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

3) How often do you have 6 or more drinks on one occasion?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|------------------------------|
| <i>Never</i> | <i>Less than monthly</i> | <i>Monthly</i> | <i>Weekly</i> | <i>Daily or almost daily</i> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

4) How often during the last year have you found that you were not able to stop drinking once you had started?

<i>Never</i>	<i>Less than monthly</i>	<i>Monthly</i>	<i>Weekly</i>	<i>Daily or almost daily</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5) How often during the last year have you failed to do what was normally expected from you because of drinking?

<i>Never</i>	<i>Less than monthly</i>	<i>Monthly</i>	<i>Weekly</i>	<i>Daily or almost daily</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6) How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?

<i>Never</i>	<i>Less than monthly</i>	<i>Monthly</i>	<i>Weekly</i>	<i>Daily or almost daily</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7) How often during the last year have you had a feeling of guilt or remorse after drinking?

<i>Never</i>	<i>Less than monthly</i>	<i>Monthly</i>	<i>Weekly</i>	<i>Daily or almost daily</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8) How often during the last year have you been unable to remember what happened the night before because you had been drinking?

<i>Never</i>	<i>Less than monthly</i>	<i>Monthly</i>	<i>Weekly</i>	<i>Daily or almost daily</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9) Have you or someone else been injured as a result of your drinking?

<i>No</i>	<i>Yes, but not in the last year</i>	<i>Yes, during the last year</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10) Has a relative or friend, or a doctor or other health worker, been concerned about your drinking or suggested you cut down?

<i>No</i>	<i>Yes, but not in the last year</i>	<i>Yes, during the last year</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The final set of questions ask about your experience in the study. Please answer them openly and honestly. They will be used to inform and improve future studies on this topic. Once you have answered each question, please click the “Submit” button at the bottom of the screen to complete the survey and receive your unique Survey Code. Use this code to receive your compensation through Mechanical Turk.

1) What was the purpose of this study? [*open-ended*]

Please indicate your level of agreement with the statements in questions 2 to 4.

2) The Facebook posts I viewed appeared to be manipulated in some way.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Neither Agree nor Disagree</i>	<i>Agree</i>	<i>Strongly Agree</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3) The number of Like, Shares, and Comments associated with the Facebook posts were about what I would expect if I saw these posts on my Facebook newsfeed.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Neither Agree nor Disagree</i>	<i>Agree</i>	<i>Strongly Agree</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4) The Comments associated with the Facebook posts were about what I would expect if I saw these posts on my Facebook newsfeed.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Neither Agree nor Disagree</i>	<i>Agree</i>	<i>Strongly Agree</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5) Do you have any other comments about this study? [*open-ended*]
(*Leave blank if none*)

[Note: This message will appear after completing the survey]

Thank you for completing the survey. To claim your \$10 through Amazon’s Mechanical Turk, use the following code: **hwr409wrk**

Appendix 5 – Thematic Content Areas Identified in the Selected Facebook Ads

Content Area	Definition
Adventure/Sensation Seeking	Any depiction of an experience that is varied, novel, and/or stimulating.
Alcohol Consumption	Any depiction of alcohol consumption. This includes intended alcohol consumption, such as holding an open beer bottle, or presumed alcohol consumption, such as an empty beer bottle. Actors or actresses must be depicted in the ad. Note: Excessive alcohol consumption will be identified through the Delphi rating process.
Animals	Any depiction of a non-human animal.
Emotions – Negative	An ad that evokes or depicts a negative emotion, including, but not limited to, sadness, guilt, anxiety, depression, pessimism, anger, or jealousy.
Emotions – Positive	An ad that evokes or depicts a positive emotion, including, but not limited to, joy, happiness, gratitude, serenity, hope, inspiration, awe, love, or optimism.
Famous People	Any depiction of a known athlete or celebrity.
Friendship	Any depiction of creating or strengthening social connections.
Games/Contests/Promotions	Any depiction of an activity that involves competition, games of chance, or giveaways as a reward for product use.
Gender - Female	A main character in the ad is female.
Gender - Male	A main character in the ad is male.
Minority	A main character in the ad is from a minority population or depictions of minority cultures are used.
Party	A lively gathering of individuals.
Product	Any display of the product, including, but not limited to, in glasses, bottles, or cans.
Public Health Message	The use of any information related to the definition of heavy or binge drinking or any other adverse consequences related to alcohol use.
Quality	Any reference to superior product characteristics, which may include, but is not limited to, taste, color, carbonation, ingredients, or the manufacturing process.
Responsibility Message	The use of any industry message related to responsible drinking, such as “Drink Responsibly” or “Live Responsibly.”
Sexuality	Any depiction of an erotic experience, expression of physical pleasure, or display of pleasing physical attributes of a main character in the ad.
Sports	Any reference to a sport, participating in a sport, or reference to a sporting event.
Time - Day	The activities in the ad primarily occurred during the day.
Time - Night	The activities in the ad primarily occurred during the night.
Time - Sunrise	Sunrise was depicted or implied by the ad.
Video Games	Any depiction of a video game or a video game character.

Appendix 6 – Thematic Content Areas in User-Generated Comments

Category	Definition	Examples
Ad Compliment	A comment that praises the ad without reference to the product.	“Best idea Ever! So cool.” “I love this commercial Budweiser always had the best commercials.”
Ad Critique or Complaint	A comment that complains about the ad or critiques the ad without reference to the product.	“Ummm...no sense whatsoever.” “Worst Super Bowl Commercial from Budweiser evvvverrrr”
Anecdote	A personal story that does not directly address current, future, or past drinking or past progress towards sobriety.	“I saw the BudWeiser horse in Binghamton N.Y. many years ago.”
Anti-Responsibility Message	A comment that encourages irresponsible behavior.	“Can't go wrong with bud behind the wheel!” “It ain't a party without a whole lotta BUD LIGHT!!”
Brand Loyalty	A comment that talks about only or mostly drinking the product or that the product is the first choice if available.	“My beer for over 40 years, still the King of beers.”
Company Response	Any response to a user generated comment from the original poster of the ad.	“Nothing will keep us from finding our lost pup! Thanks for the help, Tyson! #BestBuds”
Current Drinking	Any reference to an individual drinking as they are writing the comment.	“Havin sum now.” “Drinking one now....cheers!”
Direct Response	A comment that responds to the information presented without directly supporting or critiquing the ad.	“Yea I always tilt my glass when pouring brew!” “Tastes best from a glass bottle”
Foreign Language	A comment that is not in English.	“Como es cuando uno ya no tiene amigos solo por sus santos resan jijijiji”
Friend Tags Only	Inserting the name of an individual directly into the comment without any further context.	“James Belanger” “Max Trujillo Nick Vuglar Nano Linares Matt Billich Esgardo Marquez”
Hastags Only	Using a word or phrase preceded by a hash sign (#) without any further context.	“#iwanttobepacman” “#CorporateBeerSucks”
Hyperlinks Only	A comment that only contains a link to another website without any further context.	“ http://www.foodandwine.com/.../watch-craft-beer-fire-back... ”
Illicit Drug	Any reference to an illicit drug. This includes marijuana.	“and here in WA bud has a whole nuther meaning ~”
Inquiry	Questions by a Facebook user to the poster of the ad. This may include, but is not limited to, upcoming product releases, new advertisements, job opportunities, or tour information.	“Do you have a grown up picture of the pup(s)?”

Category	Definition	Examples
Insulting Another User	Directly insulting another Facebook user without referencing the product being advertised or using a stereotype or bigoted/prejudicial language.	“You people take this whole Budweiser commercial way to serious get a life”
Intent to Drink	Any reference to drinking in the future.	“I’m gonna grab one when i leave the barber” “Going to have a few watching the 500 today!”
Meme	The use of a concept or idea that has previously spread organically through a social media platform.	
Negative Consequences	References to negative consequences associated with product use. This may include, but is not limited to, references to passing out, blacking out, headaches, unwanted pregnancy, drunk driving, and death.	“Bottled headache juice.” “I lost a friend behind your product. U guys suck”
Other	Any comment that does not fit into any of the above categories.	“I want to be a Fiat”
Other Brand Loyalty	A comment that advocates for any alcohol brand except the brand being advertised in the post.	“Blue Moon for life” “Try Crown Royal Apple”
Past Drinking	Any reference to drinking in the past.	“Had a couple of them bad boys tonight. King of Beers fo sure” “Just had a few with the neighbor”
Patriotism	Direct associations between the product being advertised and America or symbols that represent America (e.g. the Flag, bald eagles, etc.)	“Oh Hail to the Red White and Blue!” “now owned by foreigners... how American is that?”
Photo or Video	An image or video that does not reference the product directly (e.g. images of pets).	
Policy	Any reference to an alcohol control policy, a policy related to alcohol use, or the political process.	“I thought u werent aloud to drink?”
Positive Consequences	References to positive associations with the product. This may include, but is not limited to, references to being cool, seeking relief, enjoyment, and directly stating positive emotional states.	“A few of these kills my thirst” “Some call it a six pack I call it my support group”
Product Characteristics	A description of the product being advertised. This may include, but is not limited to, carbonation, color, ingredients used, taste, and the manufacturing process.	“Suuuuper smooth freshness”

Category	Definition	Examples
Product Compliments	A comment that directly compliments the product being advertised.	“Thank you for brewing the BEST !!” “Better then fine wine”
Product Insults	A comment that directly insults the product being advertised.	“You're beer is flat and taste like moose piss.”
Promotions	Any reference to a contest or the availability of merchandise. It does not have to be specific to the brand being advertised.	“My cousin won a trip to see the UFC fight tonight in LA, thanks to Budlight #UpForWhatever, I'm a little jealous right now lol”
Reference to Time	Any reference to time that does not include a reference to drinking.	“Happy Friday” “thank God it's Saturday”
Responsibility Message	A comment that defines what "responsible drinking" should be considered based on generally accepted guidelines.	“Don't drink and drive”
Simple Emotion	A comment that only uses an acronym or an emoji to describe an emotion or emotional state.	“Lol” “♡”
Sobriety or Abstinence	Any references regarding the benefits of abstinence, how to become abstinent, or stories telling about an individual's progress towards sobriety.	“2 years sober” “I don't drink”
Sports	Any reference to a sport, sports team, or player on a sports team.	“Let's go New England”
Stereotypes	Any reference to stereotypes, or bigoted or prejudicial remarks.	“Wannabe bro hipsters are stoked” “King of rednecks”
Supporting the Message	Reiteration of the primary message in the Facebook post or insulting other products to support the brand being advertised.	“King of beers” “I would SO play Pac-Man!!!”
Tradition or Rite of Passage	Any reference to the history of the product or the product as necessary part of reaching a certain level of maturity, fitting in with a certain group, or the use of the product as a milestone achievement.	“Great heritage and tradition - thank you - may the spirit transition”

Appendix 7 – Supplementary Tables for the Methods Section

Table S18. Expected mean for ad appeal, between-subjects effects

<i>Likert Scale Units</i>			
	User Engagement	Δ	
	Low	High	Total
Score	0	1	+1
n	60	60	120
	User-generated Comments		
	Anti-Drinking	Pro-Drinking	Total
Score	0	1	+1
n	60	60	120

Table S19. Expected means for ad appeal, within-subjects effect

<i>Likert Scale Units</i>				
	Message Content N=120			
	No violation	Violation	Δ	Power
SD=1.00	0	1	+1	100
SD=1.25	0	1	+1	100
SD=1.50	0	1	+1	99
SD=2.00	0	1	+1	99
SD=3.00	0	1	+1	95

Appendix 8 – Supplementary Tables for the Results

Table S20. User engagement by brand for all Facebook ads published during the study period (n = 91)

Variable	Total*	Budweiser*	Bud Light*
Total User Engagement	34,490 (183,774)	72,723 (284,411)	8,294 (26,195)
Likes	20,574 (74,484)	40,559 (112,379)	6,881 (19,306)
Shares	13,015 (106,312)	30,223 (166,385)	1,224 (6,316)
Comments	901 (4,659)	1,941 (7,184)	189 (734)

*mean (SD)

Table S21. User engagement by brand for ads randomly selected for further evaluation (n = 50)

Variable	Total*	Budweiser*	Bud Light*
Total User Engagement	13,298 (24,540)	23,121 (34,869)	6,185 (7,789)
Likes	11,048 (18,439)	18,757 (25,891)	5,465 (6,271)
Shares	1,844 (6161)	3,563 (9,031)	600 (2,086)
Comments	406 (871)	802 (1,234)	120 (191)

*mean (SD)

Table S22. Intra-class correlations for items used to determine violations of IARD's Guiding Principles

Question	ICC
1 This ad shows situations where people are drinking an alcoholic beverage excessively, or otherwise encourages immoderate consumption.	.942
2 This ad shows situations where people are drinking alcohol irresponsibly.	.936
3 This ad suggests that being drunk or intoxicated is acceptable.	.942
4 This ad uses symbols, language, music, gestures, or cartoon characters that are associated with or are intended to appeal primarily to persons below legal purchase age.	.906
5 This ad shows traditional heroes or current celebrities, such as entertainment figures and athletes, who appeal primarily to people below legal purchase age.	.915
6 The ad associates performance success with drinking the alcohol product.	.889
7 This ad conveys the message that drinking is linked to being more energetic or dynamic.	.932
8 This ad conveys the message that alcohol improves femininity /masculinity, and/ or improves the capacity to be more attractive to others.	.927
9 This ad suggests that drinking leads to an exciting adventurous life.	.945
10 This ad suggests that drinking has a positive emotional benefit, such as reducing anxiety or depression.	.871
11 This ad conveys the message that drinking leads to having a more independent/ individualistic or cool personality.	.917
12 This ad suggests that drinking will help a person to relax or relieve stress.	.833
13 This ad portrays the alcohol product as key to sexual success.	.942
14 This ad associates the alcohol product with removing social and/ or sexual inhibitions.	.936
15 This ad conveys a message that drinking is associated with being more popular or accepted.	.942
16 This ad associates improvement of social status with drinking the alcohol product.	.921
17 This ad suggests that drinking will help to alleviate boredom or loneliness.	.936
18 This ad associates solving social, personal or physical problems with drinking the alcohol product.	.781
19 This ad associates social, professional, mental, educational, athletic or financial success with drinking the alcohol product.	.919
20 This ad shows drunk driving, or suggests that drunk driving is acceptable.	.845
21 This ad shows or suggests the use of an alcohol product before or during activities requiring sobriety or a high degree of alertness or coordination, such as driving an automobile, operating machinery, boats, working in a hazardous situation, playing sports, etc.	.930
22 This ad shows one or more people in a state of drunkenness.	.955
23 This ad suggests that it is acceptable for people to consume an alcoholic beverage to a point where they appear to lack control over their behavior, coordination, or speech.	.910

Table S22 continued. Intra-class correlations for items used to determine violations of IARD's Guiding Principles

Question	ICC
24 This ad suggests drinking is associated with violent, aggressive, antisocial, and/or hazardous behavior.	.728
25 This ad gives the impression that the alcohol product has special or unique qualities, or that it has curative or therapeutic benefits.	.594
26 This ad makes scientifically unsupported claims about the effect of an alcohol product on people's health.	.531
27 This ad refers to the alcohol content of the advertised product directly or indirectly.	.583
28 This ad shows illegal activity.	.852
29 This ad misrepresents the alcohol product and is dishonest or untruthful.	.581
30 The ad condones or trivializes excessive or irresponsible alcohol consumption.	.909
31 The ad portrays abstinence or moderate alcohol consumption in a negative way.	.873
32 The ad depicts or appears to be addressed to at-risk groups, such as pregnant women, women of childbearing age, people under legal purchase age, college students, ethnic minorities, alcoholics, or other vulnerable groups	.890
33 This ad presents alcohol as a stimulant, sedative or tranquilizer.	.886
34 This ad uses themes, images, symbols, or portrayals likely to be considered offensive, derogatory or demeaning.	.731
35 This ad is in conflict with generally accepted principles concerning respect for human dignity and integrity.	.760
36 How old do you think the youngest person in this ad is?	.988
37 How many drinks do you estimate this person is likely to consume in the situation shown in the ad?	.950

Table S23. Guideline and sub-guideline violations per ad by criterion

	Individual Criterion*	Average Criterion*	Δ	t^{\ddagger}	p
Guideline Violations	1.9 (1.3)	1.1 (1.3)	0.8	5.423	< 0.001
Sub-Guideline Violations	3.0 (2.6)	1.4 (2.1)	1.6	7.621	< 0.001

*mean (SD); ‡ df = 49

Table S24. Item level inter-rater reliability of identifying thematic content areas in selected Facebook ads

Theme	Percent Agreement	κ
Adventure/Sensation Seeking	88	0.762
Alcohol Consumption	94	0.878
Animals	98	0.94
Emotions – Negative	96	0.73
Emotions – Positive	86	0.711
Famous People	98	0.922
Friendship	90	0.758
Games/Contests/Promotions	92	0.81
Gender - Female	88	0.703
Gender - Male	90	0.802
Minority	96	0.891
Party	90	0.792
Product	90	0.786
Public Health Message*	100	.
Quality	94	0.788
Responsibility Message	94	0.789
Sexuality	96	0.778
Sports	86	0.696
Time - Day	88	0.749
Time - Night	84	0.676
Time - Sunrise	98	0.658
Video Games	96	0.864

*Unable to compute Kappa. Both variables are a constant.

Table S25. Inter-rater reliability for thematic content areas in user-generated comments

Theme	Percent Agreement	κ
Ad Compliment	95.9	0.834
Ad Critique or Complaint	96.8	0.688
Anecdote	99.4	0.629
Anti-Responsibility Message	96.9	0.665
Brand Loyalty	99.3	0.787
Company Response	99.6	0.973
Current Drinking	98.2	0.618
Direct Response	93.6	0.528
Foreign Language	99.6	0.931
Friend Tags Only	99.7	0.938
Hashtags Only	99.5	0.284
Hyperlinks Only	99.8	0.850
Illicit Drug	99.9	0.857
Inquiry	98.4	0.585
Insulting Another User	99.6	0.556
Intent to Drink	99.2	0.753
Meme	99.7	0.499
Negative Consequences	99.1	0.779
Other	99.6	0.212
Other Brand Loyalty	97.7	0.767
Past Drinking	99.6	0.802
Patriotism	99.7	0.864
Photo or Video	99.6	0.608
Policy	99.8	0.307
Positive Consequences	99.4	0.655
Product Characteristics	99.5	0.397
Product Compliments	98.2	0.725
Product Insults	97.8	0.850
Promotions	98.8	0.584
Reference to Time	99.8	0.555
Responsibility Message	99.8	0.333
Simple Emotion	99.7	0.868
Sobriety or Abstinence	99.9	0.888
Sports	99.7	0.630
Stereotypes	99.3	0.481
Supporting the Message	91.4	0.673
Tradition or Rite of Passage	99.9	0.571

Table S26. Participant demographic and behavioral characteristics, continuous and ordinal variables

Variable	Mean	SD
Age	22.7	1.1
AUDIT Score	5.8	5.9
Facebook Involvement	82.3	16.5
	Median	IQR
Income	\$40,000-\$49,999	\$20,000 to \$70,000

Table S27. Participant demographic and behavioral characteristics, nominal variables only

Variable	Count	%
Gender*		
<i>Male</i>	61	50.8
<i>Female</i>	58	48.3
Ethnicity		
<i>Hispanic</i>	16	13.3
<i>Non-Hispanic</i>	104	86.7
Race		
<i>American Indian/Native</i>	2	1.7
<i>Alaskan</i>		
<i>Asian</i>	15	12.5
<i>Black American</i>	12	10.0
<i>Caucasian</i>	82	68.3
<i>Other</i>	3	2.5
<i>Two or more races</i>	6	5.0
Marital Status*		
<i>Single, never married</i>	106	88.3
<i>Married, or domestic partnership</i>	11	9.2
<i>Widowed</i>	1	0.8
<i>Divorced</i>	1	0.8
<i>Separated</i>	0	0.0

*1 missing value

Table S28. Collapsed participant demographic and behavioral characteristics, nominal variables only

Variable	Count	%
Gender*		
<i>Male</i>	61	50.8
<i>Female</i>	58	48.3
Ethnicity		
<i>Hispanic</i>	16	13.3
<i>Non-Hispanic</i>	104	86.7
Race		
<i>Caucasian</i>	82	68.3
<i>Non-Caucasian</i>	38	31.7
Marital Status*		
<i>Single, never married</i>	106	88.3
<i>Married (present or past)</i>	13	10.8

*1 missing value

Table S29. Participant demographic and behavioral characteristics across user engagement groups, continuous and ordinal variables

Variable	High User Engagement	Low User Engagement	t^{\dagger}	p
Age*	22.7 (1.1)	22.8 (1.1)	0.040	0.968
AUDIT Score*	6.1 (6.2)	5.5 (5.6)	-0.576	0.565
Facebook Involvement	80.5 (16.2)	84.2 (16.7)	1.214	0.227
			H^{\wedge}	p
Income [‡]	\$40,000-\$49,999 (\$30,000 to \$70,000)	\$40,000-\$49,999 (\$20,000 to \$70,000)	0.094	0.760

*Mean (SD); [‡]Median (IQR); [†]Independent t-test; [^]Kruskal-Wallis test

Table S30. Participant demographic and behavioral characteristics across user engagement groups, nominal variables only

Variable	High User Engagement*	Low User Engagement*	p^{\dagger}
Gender [‡]			
<i>Male</i>	31 (50.8)	30 (51.7)	1.00
<i>Female</i>	30 (49.2)	28 (48.3)	
Ethnicity			
<i>Hispanic</i>	54 (88.5)	50 (84.7)	0.599
<i>Non-Hispanic</i>	7 (11.5)	9 (15.3)	
Race			
<i>Caucasian</i>	42 (68.9)	40 (67.8)	1.00
<i>Non-Caucasian</i>	19 (31.1)	19 (32.2)	
Marital Status [‡]			
<i>Single, never married</i>	55 (91.7)	51 (86.4)	0.394
<i>Married (present or past)</i>	5 (8.3)	8 (13.6)	

*Count (%); [‡]1 missing value; [†]Fisher's Exact test

Table S31. Participant demographic and behavioral characteristics across user-generated comments groups, continuous and ordinal variables

Variable	Pro-Drinking Comments	Anti-Drinking Comments	t^{\dagger}	p
Age*	22.7 (1.1)	22.8 (1.1)	0.337	0.737
AUDIT Score*	5.7 (6.3)	5.8 (5.6)	0.091	0.928
Facebook Involvement	81.8 (14.7)	82.8 (18.1)	0.325	0.746
			H^{\wedge}	p
Income [‡]	\$40,000-\$49,999 (\$20,000 to \$60,000)	\$40,000-\$49,999 (\$20,000 to \$70,000)	0.046	0.831

*Mean (SD); [‡]Median (IQR); [†]Independent t-test; [^]Kruskal-Wallis test

Table S32. Participant demographic and behavioral characteristics across user-generated comments groups, nominal variables only

Variable	Pro-Drinking Comments*	Anti-Drinking Comments*	<i>p</i> [†]
Gender [‡]			
<i>Male</i>	30 (52.6)	31 (50.0)	0.855
<i>Female</i>	27 (47.4)	31 (50.0)	
Ethnicity			
<i>Hispanic</i>	9 (15.5)	7 (11.3)	0.595
<i>Non-Hispanic</i>	49 (84.5)	55 (88.7)	
Race			
<i>Caucasian</i>	37 (63.8)	45 (72.6)	0.331
<i>Non-Caucasian</i>	21 (36.2)	17 (27.4)	
Marital Status [‡]			
<i>Single, never married</i>	48 (84.2)	58 (93.5)	0.143
<i>Married (present or past)</i>	9 (15.8)	4 (6.5)	

*Count (%); [‡]1 missing value; [†]Fisher's Exact test

Table S33. Participant demographic and behavioral characteristics across all groups, continuous and ordinal variables

Variable	High user engagement/ pro-drinking comments	High user engagement/ anti-drinking comments	Low user engagement/ pro-drinking comments	Low user engagement/ anti-drinking comments	<i>F</i> [†]	<i>p</i>
Age*	22.8 (1.1)	22.7 (1.2)	22.8 (1.1)	22.7 (1.0)	0.043	0.988
AUDIT Score*	4.9 (4.0)	6.0 (7.0)	6.7 (6.6)	5.4 (5.7)	0.521	0.669
Facebook Involve- ment	85.8 (16.5)	82.4 (17.0)	79.9 (19.3)	81.1 (12.2)	0.715	0.545
Income [‡]	\$40,000- \$49,999 (\$20,000 to \$70,000)	\$40,000-\$49,999 (\$20,000 to \$80,000)	\$40,000-\$49,999 (\$20,000 to \$70,000)	\$30,000-\$39,999 (\$20,000 to \$50,000)	<i>H</i> [^]	<i>P</i>
					0.173	0.982

*Mean (SD); [‡]Median (IQR); [†]One-way ANOVA; [^] Kruskal–Wallis test

Table S34. Participant demographic and behavioral characteristics across all groups, nominal variables only

Variable	High user engagement/ pro-drinking comments *	High user engagement/ anti-drinking comments *	Low user engagement/ pro-drinking comments *	Low user engagement/ anti-drinking comments *	<i>p</i>[†]
Gender [‡]					
<i>Male</i>	14 (46.7)	16 (57.1)	17 (53.1)	14 (48.3)	0.854
<i>Female</i>	16 (53.3)	12 (42.9)	15 (46.9)	15 (51.7)	
Ethnicity					
<i>Hispanic</i>	5 (16.7)	4 (13.8)	2 (6.3)	5 (17.2)	0.539
<i>Non-Hispanic</i>	25 (83.3)	25 (86.2)	30 (93.8)	24 (82.8)	
Race					
<i>Caucasian</i>	21 (70.0)	19 (65.5)	24 (75.0)	18 (62.1)	0.717
<i>Non-Caucasian</i>	9 (30.0)	10 (34.5)	8 (25.0)	11 (37.9)	
Marital Status [‡]					
<i>Single, never married</i>	27 (90.0)	24 (82.8)	31 (96.9)	24 (85.7)	0.279
<i>Married (present or past)</i>	3 (10.0)	5 (17.2)	1 (3.1)	4 (14.3)	

*Count (%); [‡]1 missing value; [†]Fisher's Exact test