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Article

Predicting Regulatory Compliance in Beer Advertising on Facebook

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ABSTRACT

Aims: The prevalence of alcohol advertising has been growing on social media platforms. The purpose of this study was to evaluate alcohol advertising on Facebook for regulatory compliance and thematic content.

Methods: A total of 50 Budweiser and Bud Light ads posted on Facebook within 1 month of the 2015 NFL Super Bowl were evaluated for compliance with a self-regulated alcohol advertising code and for thematic content. An exploratory sensitivity/specificity analysis was conducted to determine if thematic content could predict code violations.

Results: The code violation rate was 82%, with violations prevalent in guidelines prohibiting the association of alcohol with success (Guideline 5) and health benefits (Guideline 3). Overall, 21 thematic content areas were identified. Displaying the product (62%) and adventure/sensation seeking (52%) were the most prevalent. There was perfect specificity (100%) for 10 content areas for detecting any code violation (animals, negative emotions, positive emotions, games/contests/promotions, female characters, minorities, party, sexuality, night-time, sunrise) and high specificity (>80%) for 10 content areas for detecting violations of guidelines intended to protect minors (animals, negative emotions, famous people, friendship, games/contests/promotions, minorities, responsibility messages, sexuality, sunrise, video games).

Conclusions: The high prevalence of code violations indicates a failure of self-regulation to prevent potentially harmful content from appearing in alcohol advertising, including explicit code violations (e.g. sexuality). Routine violations indicate an unwillingness to restrict advertising content for public health purposes, and statutory restrictions may be necessary to sufficiently deter alcohol producers from repeatedly violating marketing codes.

Short summary: Violations of a self-regulated alcohol advertising code are prevalent in a sample of beer ads published on Facebook near the US National Football League's Super Bowl. Overall, 16 thematic content areas demonstrated high specificity for code violations. Alcohol advertising codes should be updated to expressly prohibit the use of such content.

INTRODUCTION

Systematic reviews have concluded that exposure to alcohol advertising is a possible causal risk factor for earlier alcohol initiation and increased alcohol consumption (Anderson *et al.*, 2009; Smith and Foxcroft, 2009). Moreover, a recent review concluded that exposure to alcohol advertising is also associated with the initiation of binge drinking (i.e. ≥4 drinks per session for females; ≥5 drinks per session for males) (Jernigan *et al.*, 2017). Because of these effects,

public health and addiction researchers have called for stronger alcohol advertising restrictions (Babor *et al.*, 2017).

In the USA, there are no federal alcohol advertising regulations. Instead, a self-regulated advertising control system exists, wherein the alcohol industry has promulgated a set of guidelines, enforces the guidelines, and adjudicates potential guideline violations (Campbell, 1999). Producers of beer, wine and distilled spirits have agreed to follow similar but distinct codes that were created by industry trades associations, (DISCUS, 2011; Wine Institute, 2011; U.S. Beer Institute, 2015), and a model self-regulated alcohol advertising code has been published by the International Alliance for Responsible Drinking (IARD). Called the Guiding Principles, this code is intended to apply to all alcohol advertising in all media in countries where self-regulation predominates, and were agreed upon by 11 of the largest transnational alcohol producers (IARD, 2011).

The regulations within the Guiding Principles are divided into exposure and content guidelines. The exposure guideline specifies that alcohol advertising should not be broadcast or displayed where the percent of individuals under the minimum legal purchase age exceeds 30% (IARD, 2011). Exposure studies have concluded that this guideline is often violated. For example, in 2010, 23.7% of alcohol ads broadcast on television in 15 of the largest US markets were non-compliant (Jernigan *et al.*, 2013), and from 2005 to 2012, youth under the legal purchase age were exposed to 15.2 billion non-compliant impressions, which was defined as the number of times an individual or group saw an ad (Ross *et al.*, 2016).

Content guidelines are classified along five major themes: promoting responsible marketing communications; prohibiting depictions of irresponsible consumption; suggestions that alcohol has health benefits; protection of minors; and social, physical and sexual consequences of alcohol use (IARD, 2011). An example guideline includes 'Alcohol beverage marketing communications should not…present alcohol beverages as necessary for social success or acceptance.'

Compliance studies of the content guidelines indicate poor code compliance and an inability to prevent content that may be harmful to vulnerable populations, such as youth (Noel *et al.*, 2017a, 2017b, 2017c, 2017d). In studies that used pre-selected ads, typically selected based on their documented appeal to youth, the code violation rate was 100%. For studies that randomly sampled ads or used a total survey approach, whereby all ads were collected within a given period, violation rates ranged from 12 to 86% for television ads and 0 to 52% for magazine ads.

Recently, several studies have reported on the content of digital alcohol advertising (Lobstein *et al.*, 2017), and digital alcohol ads have grown dramatically in recent years, particularly on social media (Jernigan and Rushman, 2014). For example, among 701 posts published by 12 UK alcohol brands on Facebook and Twitter in November 2011, common marketing elements included real-world tie-ins, interactive games, competitions and time-specific suggestions to drink (Nicholls, 2012). Age-gating technology, which can be used to prevent underage individuals from accessing such information, may be effective for some platforms (Winpenny *et al.*, 2014), but since age information is not verified against an independent source, such technology can also be easily subverted by providing false information (Jones *et al.*, 2014). Moreover, a comparison of corporate-sponsored alcohol-branded accounts on Twitter and Instagram against the alcohol industry's Digital Guiding Principles concluded that underage profiles had unobstructed access to these accounts (Barry *et al.*, 2016).

Despite these studies, several gaps in the literature remain. For example, only one study has evaluated digital advertising for code compliance (Gordon, 2011). There, beer-branded websites were evaluated, and the reported code violation rate was 74%. Moreover, no study has described how alcohol is portrayed (i.e. thematic content) within social media advertising. The primary purpose of this study was to determine the rate of code compliance among a sample of alcohol ads posted on social media. Second, the most accurate method to calculate code violations was determined, and a separate thematic content analysis of the ads was performed. Because few studies have empirically linked code violations with thematic content, an exploratory analysis was conducted to determine if the presence or absence of a theme could predict code compliance regarding both general guidelines and those specifically intended to protect minors.

METHODS

Social media and advertisement selection

Facebook was selected because it was the largest social media platform in the USA (Statista, 2016), and the most popular platform among US teens and young adults (Madden *et al.*, 2013; Winpenny *et al.*, 2014; Lenhart, 2015). A Facebook ad was defined as a post published on a corporate-sponsored alcohol-branded Facebook page that was intended to appear in a Facebook user's News Feed. Each ad included an image or video and any text written by the brand that appeared immediately above the image or video. Because many alcohol brands advertise on Facebook, only ads published by sponsors of the National Football League's (NFL) 2015 Super Bowl (i.e. Budweiser and Bud Light) were included. Only ads published from 1 month prior to 1 month after the Super Bowl were included in the sample.

The 2015 Super Bowl was selected as an anchor point because it was the largest media event in the USA in 2015 (Schneider, 2015), and during the event, there were 265 million Super Bowl related Facebook interactions (Cynopsis Media, 2015). The period was selected to ensure that all ads relevant to the Super Bowl were included in the sample. Ads were limited to only sponsors of the NFL Super Bowl for practical considerations, as sponsors of large media events are likely to benefit from greater ad exposure, and for logistical considerations, as the process for evaluating alcohol ads for compliance with a self-regulated advertising code was resource intensive. Facebook ads that met the inclusion criteria were downloaded using NVivo Version 10 (QSR International, Inc., Burlington, MA, USA). From this population of ads, 50 out of 91 (55%) were randomly selected for further evaluation using Microsoft Excel's random number generator. The analysis was limited to 50 ads due to the limited resources available to complete the study.

Raters and rater recruitment

The ads were evaluated for violations of the Guiding Principles by a panel of experts, which consisted of researchers and practitioners, who had previous experience in the substance use, marketing, advertising and/or public health fields, and had the expertise necessary to protect vulnerable populations. No additional information was allowed to be collected on the raters due to the protocol being approved by the local IRB as exempt. Similar samples have been previous used for rating ads (Jones *et al.*, 2008; Babor *et al.*, 2013a, 2013b; Noel *et al.*, 2017a, 2017b, 2017c, 2017d). The 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 promoted by all major US alcohol

producers (IARD, 2011). The Guiding Principles were also selected because the alcohol industry's Digital Guiding Principles do not specify further ad content restrictions beyond those listed in the original Guiding Principles (IARD, 2014).

The raters were recruited by email. Invitations were sent to 32 experts; 11 responded (34%). All 11 expert raters completed Rounds 1 and 2 of the ratings (100%). Upon completion of the rating procedure, each rater received a $100 Amazon gift card.

Code violation ratings

Ads were evaluated using the Delphi technique, which is a structured communication procedure used to build group consensus and reduce the subjectivity of the responses (Hasson *et al.*, 2000; Powell, 2003). Two rounds of rating were used. During Round 1, all ads were rated independently by a panel of raters. During Round 2, all ads were independently rated again, but each rater was provided the median and range of scores for each question for each ad from Round 1, and anonymous comments made by other raters during Round 1. This procedure, and specifically providing feedback to the raters during Round 2, has been found to significantly reduce the variance of the responses, which suggests greater consensus (Babor *et al.*, 2013a, 2013b).

Ads were rated using a 37-item questionnaire that was developed to detect violations of self-regulated alcohol advertising codes (Babor *et al.*, 2008, 2013a, 2013b). Three types of questions were used. First, 35 questions, using a 5-point Likert scale, asked raters whether they agreed or disagreed with a statement (e.g. 'This ad depicts situations where alcohol is being consumed excessively'). The response categories were Strongly Disagree, Disagree, Neither Disagree nor Agree, Agree, Strongly Agree. Second, raters were asked to identify the perceived age of the youngest actor/actress in the ad (i.e. 'How old do you think the youngest person in this ad is?'). Third, raters were asked to indicate the perceived amount of drinking 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?'). Age and drinking perception questions were included in the rating questionnaire because the Guiding Principles specifically bar depictions of minors and require alcohol ads to only portray responsible alcohol consumption (IARD, 2011). A question-by-question rating guide was provided to assist each rater.

Rating procedure

During Round 1, expert raters 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. 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. This rating procedure was conducted online. The UConn Health Institutional Review Board approved this procedure as an exempt protocol.

Code violation scoring

The Guiding Principles contain five guidelines, each of which contains multiple sub-guidelines, and each sub-guideline often contains multiple items. Two algorithms were used to determine compliance with the Guiding Principles; these algorithms are referred to as the individual and average criteria. For the individual criterion, each

rater-specific item-level rating was first dichotomized to indicate the status of an item-specific violation (Babor *et al.*, 2013a, 2013b). 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 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.

For the average criterion, the scores for each item for each ad were initially averaged across raters. Then, item-specific violations were determined (Babor *et al.*, 2013a, 2013b). A sub-guideline violation was indicated if any items associated with the sub-guideline were violated. A guideline violation was indicated if any sub-guidelines were violated. An ad was coded as containing a violation if any guideline violations were present. For both criteria, item-level violations were defined as follows:

- ≥4 (Agree) for Likert scale questions;
- <21 years old for the approximate age of the youngest actor/actress; and
- ≥5 drinks for the amount of alcohol perceived to be consumed.

Thematic content analysis

Two expert raters completed an inductive content analysis on the selected ads. Independently, each rater developed a list of content areas and accompanying definitions. Next, the raters met and agreed on a final list of content areas and definitions. The ads were then rated again. The raters also specifically identified public health responsibility messages, which were defined as promoting alcohol abstinence or alcohol consumption within current Centers for Disease Control and Prevention (CDC) guidelines (i.e. <5 drinks per session or ≤14 drinks per week for men, <4 drinks per session or ≤7 drinks per week for women) (CDC, 2016). Finally, the raters met and reconciled any remaining coding discrepancies. If a theme was present in an ad, 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.

Inter-rater reliability

For the code violation ratings, item-level inter-rater reliability was assessed using (2,k) intra-class correlations (ICCs). Only items with an ICC ≥ 0.6, which indicates substantial or better reliability, were included in the code violation scoring algorithms. For the content analysis, inter-rater reliability was assessed using a pooled Cohen's kappa (de Vries *et al.*, 2008).

Descriptive and exploratory analyses

The number of Likes, Shares and Comments elicited by the ads selected and not selected for evaluation were compared using an independent *t* test to ensure the sample was representative. The frequency of code violations was calculated at the ad and guideline level using the individual and average criteria. The violation rates based on the individual and average criteria were compared at the ad and guideline level using Fisher's exact test, which was selected due to several expected cell values <5. Because the average criterion relies on arithmetic means, it may be affected by non-normal distributions within the data, unlike the individual criterion, which is non-parametric. Therefore, the skewness of the distributions of the item-level responses were examined to help identify the most

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accurate scoring algorithm for determining violation status. Significant skew was assessed using *Z*-tests.

The prevalence of each identified thematic content area was calculated at the ad level. An exploratory sensitivity and specificity analysis was performed to determine if the content areas could accurately predict any violations in the ads and violations specific to the protection of minors, and to determine if thematic content was associated with code violations, as indicated by previous research (Noel *et al.*, 2017a, 2017b, 2017c, 2017d). Statistical analysis was performed using SPSS Version 22.0 (Armonk, NY: IBM Corp.). Statistical significance was set at 0.05.

RESULTS

In all, 91 alcohol ads were posted by Budweiser (37 ads) and Bud Light (54 ads) on Facebook during the study period. The ads elicited ~1.8 million Likes, 1.2 million Shares and 82,000 Comments by 8 December 2015. Each ad, on average, elicited 20,574 Likes, 13,015 Shares and 901 Comments. Among the 50 randomly selected Facebook ads, 29 were published by Bud Light (58%) and 21 were published by Budweiser (42%). Each selected ad, on average, elicited 11,048 Likes, 1,844 Shares and 406 Comments. There were no significant differences in user engagement between the ads selected and non-selected for evaluation ($t(89) = 1.218$, $P = 0.226$).

Prevalence of code violations
Inter-rater reliability of 33 of the 37 questions met the pre-established cut-off point of ICC ≥ 0.6 (ICCs = 0.73–0.99) and were used in the violation scoring algorithms. Based on the individual criterion, 82% (41 ads) of the ads contained 1 or more violations of the Guiding Principles (Table 1). More than 50% of the ads violated Guideline 5 (social, physical and sexual consequences of alcohol use) and Guideline 3 (suggestions that alcohol has health benefits). Based on the average criterion, 58% (29 ads) of the ads contained 1 or more violations of the Guiding Principles. The overall violation rate and the violation rate of 4 of the 5 guidelines was significantly higher according to the individual criterion compared to the average criterion (P's < 0.01). Examples of code violations are in Supplemental Fig. 1. Among the 1850 questions used in the rating procedure (37 questions × 50 ads), the distribution of the responses for 20.5% of the questions were significantly skewed (P's < 0.05).

Prevalence of thematic content
Overall, 21 unique thematic content areas were identified in the Facebook ads. The definitions of each content area are provided in Supplemental Table 1. Inter-rater reliability between the raters was substantial ($\kappa_{pooled} = 0.79$). At least 50% of the ads contained the

product (62%), used adventure/sensation seeking (52%), used male characters (50%) or referenced sports (50%) (Table 2). Overall, 44% of the ads depicted alcohol consumption or a party atmosphere. Although 20% of ads contained an industry responsibility message, no ads contained a public health message.

Predicting code violations
The sensitivity of any thematic content area for detecting code violations was poor (Table 3). However, several content areas demonstrated high specificity. Every ad that contained animals, emotions—negative, emotions–positive, games/contests/promotions, female characters, minorities, party, sexuality, time—night or time—sunrise contained at least one code violation. Moreover, five additional content areas had a specificity >88% (i.e. adventure/sensation seeking, famous people, friendship, responsibility messages, video games).

Only 1 content area had marginally high sensitivity for detecting violations of guidelines intended to protect minors (sexuality [sensitivity = 74%]), although, similar to predicting any violation, several content areas demonstrated high specificity (Table 4). Every ad that contained the thematic content areas of emotions—negative or time—night violated guidelines intended to protect minors. Eight additional content areas had a specificity >80% (i.e. animals, famous people, friendship, games/contests/promotions, minorities, quality, responsibility messages, time—sunrise).

DISCUSSION

Violations of a self-regulated alcohol advertising code were prevalent in the sample of Bud Light and Budweiser Facebook ads evaluated. There was also a high prevalence of thematic content that may be appealing to youth. Many of these content areas may reliably predict the presence of code violations since every ad containing these content areas contained at least one violation, including violations of guidelines intended to protect individuals under the minimum legal purchase age, although no single content area reliably predicted all code violations.

Ineffectiveness of self-regulation
This is the first study to systematically evaluate alcohol advertising on social media for compliance with the content guidelines of a self-regulated alcohol advertising code. The results strongly suggest that the current system of self-regulation has failed to control the content of Bud Light and Budweiser ads broadcast prior to and following a major media sporting event. The violation rate among the ads was 82%, which is consistent with the violation rate of 74% reported for beer-branded websites (Gordon, 2011) and with recent reporting that corporate-sponsored alcohol-branded social media accounts are

Table 1. Prevalence of ad and guideline-level violations of IARD's Guiding Principles in Facebook alcohol advertising by scoring criterion

Guideline	Guideline description	Individual criterion[a]	Average criterion[a]	P[b]
Total		82 (41)	58 (29)	<0.01
Guideline 1	Promoting responsible marketing communications	2 (1)	0 (0)	1.00
Guideline 2	Prohibiting depictions of irresponsible consumption	32 (16)	14 (7)	<0.01
Guideline 3	Suggestions that alcohol has health benefits	52 (26)	24 (12)	<0.01
Guideline 4	Protection of minors	38 (19)	30 (15)	<0.01
Guideline 5	Social, physical and sexual consequences of alcohol use	64 (32)	46 (23)	<0.01

[a]Percent of total (number of ads).
[b]Fisher's exact test.

Table 2. Prevalence of thematic content in Budweiser and Bud Light ads published on Facebook, % (*n*)

Theme	Prevalence
Product	62% (31)
Adventure/sensation seeking	52 (26)
Male characters	50 (25)
Sports	50 (25)
Alcohol consumption	44 (22)
Party	44 (22)
Emotions—positive	40 (20)
Time—day	38 (19)
Time—night	36 (18)
Female characters	34 (17)
Friendship	30 (15)
Minority	24 (12)
Animals	22 (11)
Games/contests/promotions	20 (10)
Responsibility message	20 (10)
Video games	18 (9)
Famous people	16 (8)
Quality	16 (8)
Sexuality	12 (6)
Emotions—negative	6 (3)
Time—sunrise	4 (2)
Public health message	0 (0)

Table 3. Sensitivity and specificity of thematic content in Facebook alcohol advertising at detecting any code violation

Theme	Sensitivity	Specificity
Adventure/sensation seeking	0.61	0.89
Alcohol consumption	0.46	0.67
Animals	0.27	1.00
Emotions—negative	0.07	1.00
Emotions—positive	0.49	1.00
Famous people	0.17	0.89
Friendship	0.34	0.89
Games/contests/promotions	0.24	1.00
Female characters	0.42	1.00
Male characters	0.56	0.78
Minority	0.29	1.00
Party	0.54	1.00
Product	0.66	0.56
Quality	0.12	0.67
Responsibility message	0.22	0.89
Sexuality	0.15	1.00
Sports	0.56	0.78
Time—day	0.37	0.56
Time—night	0.44	1.00
Time—sunrise	0.05	1.00
Video games	0.20	0.89

Table 4. Sensitivity and specificity of thematic content in Facebook alcohol advertising at detecting violations of guidelines intended to protect minors

Theme	Sensitivity	Specificity
Adventure/sensation seeking	0.53	0.48
Alcohol consumption	0.42	0.55
Animals	0.37	0.87
Emotions—negative	0.16	1.00
Emotions—positive	0.63	0.74
Famous people	0.32	0.94
Friendship	0.47	0.81
Games/contests/promotions	0.42	0.94
Female characters	0.42	0.71
Male characters	0.74	0.65
Minority	0.37	0.84
Party	0.47	0.58
Product	0.47	0.29
Quality	0.32	0.87
Responsibility message	0.11	0.87
Sexuality	0.74	0.65
Sports	0.42	0.65
Time—day	0.47	0.71
Time—night	0.11	1.00
Time—sunrise	0.32	0.90

which increases the likelihood that the most prevalent content in the ads is likely aimed at this demographic.

The ineffectiveness of alcohol advertising self-regulation of is also demonstrated by the consistent use of themes in ads published before and after the introduction of self-regulation in the late 1990s. 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. For example, early evaluations of alcohol advertising in the US concluded that depictions of physical activity and hazardous activities were prevalent (Finn and Strickland, 1982), and US alcohol advertising in the late 1990s and early 2000s contained a high prevalence of the theme masculinity (Austin and Hust, 2005; Noel *et al.*, 2017a, 2017b, 2017c, 2017d).

Routine violation of a self-regulated advertising code by the alcohol industry indicates an unwillingness to restrict their advertising content for public health purposes. Statutory restrictions may be necessary to sufficiently deter alcohol producers from repeatedly violating marketing codes. Public health advocates have recently called for a ban on alcohol marketing, or if a ban is unfeasible, strong legislative restrictions similar to France's Loi Evin (1991), which limits alcohol ads to only the name of the alcohol producer, the name of the brand, and product characteristics (Parlement Français, 1991).

Predicting code compliance

Certain types of thematic content may reliably predict the presence of code violations, despite being unable to predict the absence of code violations. In all, 16 content areas had high specificity for detecting any violations or violations of guidelines specifically intended to protect individuals under the minimum legal purchase age. These findings support previous research that found several content areas in television advertising were associated with alcohol code violations, including ethnicity, sensation seeking, sociability and romance (Noel *et al.*, 2017a, 2017b, 2017c, 2017d). There are

unlikely to comply with the Digital Guiding Principles (Barry *et al.*, 2016).

This is the first study to evaluate thematic content in alcohol advertising published on Facebook. The analysis 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 social media to specifically target 21–34 years old men (Dupre, 2013),

two practical consequences to this finding. First, content areas that can reliably predict code violations could be added to the list of prohibited content detailed in existing self-regulated alcohol advertising codes; however, additional research is needed to confirm these results.

Second, if these content areas can reliably detect code violations in other ad samples, they may act as a useful screening tool for determining whether an alcohol ad is non-compliant with a marketing code and a complaint should be filed with the respective trade association or other governing body. Using thematic content may provide a more efficient method for researchers, public health practitioners, advocates, laypersons and alcohol marketing personnel to detect code violations compared to the process described here and elsewhere (Babor *et al.*, 2008, 2013a, 2013b; Noel *et al.*, 2017a, 2017b, 2017c, 2017d). Due to the numerous questions and multiple rounds of rating, the process is resource intensive and may not adequately meet the needs of individuals attempting to prevent, or reduce the impact of, alcohol ads that are in violation of existing content guidelines. On the other hand, screening ads for thematic content requires fewer raters, fewer questions, and because the response options are dichotomous rather than Likert scales, less time is needed to answer each question. Additionally, a program that screens alcohol ads for thematic content may more effectively be integrated into the creative ad process. That is, in order to produce a compliant ad, marketers will know specific content areas to avoid rather than attempt to interpret the ambiguous terms currently employed by self-regulated alcohol marketing codes (Noel *et al.*, 2017a, 2017b, 2017c, 2017d).

Measuring code compliance

When the ad rating system used in this study was established, the individual criterion and the average criterion were simultaneously developed as equally valid algorithms (Babor *et al.*, 2008). Based on the results presented here, the individual criterion appears to more accurately measure code compliance than the average criterion owing to skewed distributions of the raters' responses, which were prevalent during the rating procedure. The effect of skew was particularly apparent regarding the perceived age of the youngest actor or actress in the ad. The mean perceived age in seven of the ads was <21 years old. For five of those ads, a majority of the expert raters perceived the youngest actor or actress to be 21 years old or older but the minority of responses below 21 years old were extreme enough to move the mean below the violation cut-off point. Allowing biases such as this to occur will produce inaccurate estimates of code compliance.

Limitations

The primary limitation of this study is a lack of generalizability. Due to the intensity of current procedures to determine code compliance, the number of ads evaluated was substantially smaller than all possible alcohol ads, and the final sample of ads was limited to those produced by only two beer brands, which, in turn, are produced by only one alcohol producer. Although other studies have demonstrated similar ad violation rates across alcohol producers (Babor *et al.*, 2013a, 2013b; Noel *et al.*, 2017a, 2017b, 2017c, 2017d), it is unclear whether the high violation rate for social media 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. The high specificity of the content areas may be due to the high prevalence of code violations in the sample. Conducting a similar analyses in a sample of ads with a lower code violation rate may produce different results. However, previous research indicates that code violations are most prevalent among ads that generate the most exposure (Noel *et al.*, 2017a, 2017b, 2017c, 2017d), which may indicate the results will be robust when applied elsewhere. Finally, the use of expert raters may have biased the results towards a higher code violation rate because they had experience in protecting vulnerable population and may be overly aggressive when rating the ads. However, previously research indicates experts are either similar to or more conservative in their ratings compared to community raters (Babor *et al.*, 2013a, 2013b; Vendrame *et al.*, 2015).

CONCLUSIONS

Combined with previous work (Barry *et al.*, 2016), the present study adds to the growing body of literature concluding that alcohol advertising on social media is not adhering to the industry's self-regulated advertising codes. Furthermore, ad content that has a high specificity for code violations could be expressly banned by alcohol advertising codes and may be used as a screening method to identify alcohol ads that may violate these codes. The individual scoring criterion is the ideal method to determine code compliance because it is robust against non-normal distributions.

SUPPLEMENTARY MATERIAL

Supplementary data are available at *Alcohol And Alcoholism* online.

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CONFLICT OF INTEREST STATEMENT

The authors have no conflicts of interest.

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