



SUBSTANCE USE & MISUSE  
An International Interdisciplinary Forum

## Substance Use & Misuse

ISSN: 1082-6084 (Print) 1532-2491 (Online) Journal homepage: <https://www.tandfonline.com/loi/isum20>

# Perceptions of Alcohol Advertising Vary Based on Psychological Characteristics

Jonathan K. Noel, Ziming Xuan & Thomas F. Babor

To cite this article: Jonathan K. Noel, Ziming Xuan & Thomas F. Babor (2019): Perceptions of Alcohol Advertising Vary Based on Psychological Characteristics, Substance Use & Misuse, DOI: [10.1080/10826084.2018.1555258](https://doi.org/10.1080/10826084.2018.1555258)

To link to this article: <https://doi.org/10.1080/10826084.2018.1555258>



Published online: 16 Jan 2019.



Submit your article to this journal 



Article views: 6



View Crossmark data 



## Perceptions of Alcohol Advertising Vary Based on Psychological Characteristics

Jonathan K. Noel<sup>a</sup>, Ziming Xuan<sup>b</sup>, and Thomas F. Babor<sup>c</sup>

<sup>a</sup>Department of Health Science, Johnson & Wales University, Providence, RI, USA; <sup>b</sup>Department of Community Health Sciences, Boston University School of Public Health, Boston, MA, USA; <sup>c</sup>Department of Community Medicine and Health Care, University of Connecticut School of Medicine, Farmington, CT, USA

### ABSTRACT

**Background:** The alcohol industry recognizes children and pregnant women as population sub-groups vulnerable to the effects of alcohol marketing. Research indicates that heavy alcohol users are also potentially vulnerable to alcohol marketing. The purpose of the current study is to determine if sub-groups defined by psychological characteristics should be classified as potentially vulnerable as well. **Methods:** College students ( $n=326$ ) from two northeast schools were recruited to complete a survey containing questions on demographics, alcohol use, and psychological characteristics (alcohol expectancies, alcohol dependence, sensation seeking traits, and past delinquent behaviors). Additionally, after viewing each of five alcohol ads (4 television and 1 magazine), participants answered questions about their perceptions of alcohol consumption, responsible drinking, excessive drinking, and appeal of the ads. Main effects were assessed using hierarchical linear modeling, with adjustment for age, sex, race, ethnicity, and AUDIT score. **Results:** Alcohol expectancies ( $p < .001$ ), particularly the social and physical pleasure and social expressiveness sub-scales, and sensation seeking traits ( $p = .002$ ) were positively associated with alcohol ad appeal. Alcohol dependence symptoms, specifically impaired control and tolerance, were positively associated with perceptions of responsible drinking ( $p = .035$ ), even though mean perceived number of drinks consumed met the definition of binge drinking. **Conclusions:** Individuals with positive alcohol expectancies, sensation seeking traits, and alcohol dependence may be vulnerable to alcohol advertising and marketing. Because alcohol advertising often contains content that can serve as a cue or reinforce to drink, specific regulations may be needed to prevent alcohol-related harm from occurring in these sub-populations.

### KEYWORDS

Alcohol; advertising; marketing; perception; self-regulation; vulnerability

## Introduction

According to Babor et al. (2017), a population group should be considered “vulnerable” to alcohol marketing if its members are particularly susceptible to alcohol-related harm and are also responsive to the effects of alcohol marketing. If a population meets this definition, specific regulations should be promulgated to protect them. Currently, children are universally accepted as vulnerable to alcohol marketing (International Alliance for Responsible Drinking [IARD], 2011). Children are unlikely to have the required cognitive ability to differentiate commercial advertising messages from programmatic information (Harris & Graff, 2011; Institute of Medicine, 2004), and children and adolescents who are aware of commercial advertising may lack the

ability to balance short-term rewards against long-term health consequences (Pechmann, Levine, Loughlin, & Leslie, 2005). Furthermore, because brain development in children is incomplete, they are vulnerable to significant consequences of alcohol use. For example, heavy drinking during adolescence is associated with abnormal brain development, decreased cognitive ability, decreased emotional and behavioral control, and an increased risk of developing alcohol use disorders later in life (Bava & Tapert, 2010; Welch, Carson, & Lawrie, 2013).

Other population subgroups may also possess vulnerability characteristics. Pregnant women, for example, who consume alcohol are at a significantly increased risk of that their offspring will be diagnosed with fetal alcohol spectrum disorder (FASD), as well

as have physical, learning or behavioral disorders (Barr et al., 2006; Barr & Streissguth, 2001; Henderson, Kesmodel, & Gray, 2007; Lewis et al., 2012; Murray et al., 2016; Sokol, Delaney-Black, & Nordstrom, 2003; Zuccolo et al., 2013). Indeed, the alcohol industry recognizes the unique health risks for pregnant women by explicitly identifying them as a vulnerable population in their model set of alcohol marketing regulations (IARD, 2011).

Recent evidence suggests that the number of populations considered vulnerable to alcohol marketing could be expanded. For example, heavy drinkers with alcohol use disorders may require specific protections due to the health consequences of chronic alcohol use, susceptibility to relapsing, and positive reactions to alcohol marketing messages. Long-term heavy alcohol consumption is associated with heart disease, cancer, liver disease, mental illness, and learning, memory and social disorders (National Institute on Alcohol Abuse and Alcoholism [NIAAA], 2000). College students who are heavy drinkers, as defined by the Alcohol Use Disorders Identification Test (AUDIT), found alcohol ads to be more appealing, perceived greater alcohol consumption in the ads, and perceived such alcohol consumption as more "responsible" than nonheavy drinking college students (Noel, Xuan, & Babor, 2018). Additionally, the affective responses of arousal and momentary pleasure significantly increased after exposure to alcohol ads in a study involving only heavy drinking young adults (Stautz, Frings, Albery, Moss, & Marteau, 2017). In another study of beer advertising, each 1 unit increase in the AUDIT score was associated with 1.4, 1.1, and 2.5% increase in source appeal (i.e., the perceived attractiveness of the message senders), informational appeal (i.e., the appeal of the product qualities), and emotional appeal (e.g., changes in emotions due to ad content), respectively (Noel, Babor, & Grady, 2018).

The present study was conducted to determine if population subgroups defined by psychological characteristics, including alcohol dependence, alcohol expectancies, sensation seeking traits, and delinquency characteristics, are potentially vulnerable to alcohol marketing. Several studies have demonstrated that alcohol dependence symptoms are associated with stronger responses to alcohol cues. Alcohol dependent drinkers have reported significantly increased cravings and alcohol demand after exposure to an alcohol cue, with little sensitivity to price (MacKillop et al., 2010), and increased neural responses to alcohol images are associated with increased alcohol consumption and alcohol-related problems (Dager et al., 2014). Similar

results have occurred in adolescents, where 14–19 year old adolescents diagnosed with alcohol use disorder reported greater subjective cravings and have greater salivation after exposure to alcohol cues compared to nonalcoholics (Thomas, Drobis, & Deas, 2005). Moreover, alcohol dependent individuals have shown greater cue reactivity in the motivational pathways of the brain and stronger subjective cravings than either healthy controls or patients with co-morbid depression or anxiety (Sjoerds, van den Brink, Beekman, Penninx, & Veltman, 2014). Alcohol cue reactivity may also be predictive of relapse among heavy alcohol users (Garland, Franken, & Howard, 2012), and recovering alcoholics have stated that alcohol advertising can serve as a trigger to begin drinking again (Treise, Taylor, & Wells, 1995).

Increased positive alcohol expectancies are associated with problematic drinking in male and female adolescents (Schulte, Ramo, & Brown, 2009), and lowering these expectancies has been shown to reduce short-term drinking among college students (Scott-Sheldon, Terry, Carey, Garey, & Carey, 2012). Alcohol expectancies in youth can be influenced by adults and peers, with greater alcohol use typically associated with increased positive expectancies (Glanton & Wulfert, 2013; Martino, Collins, Ellickson, Schell, & McCaffrey, 2006). These expectancies, in turn, may influence perceptions of alcohol advertising. For example, in a sample of college students, individuals with greater expectancies for social and physical pleasure from drinking perceived more alcohol consumption in alcohol advertising (Proctor, Babor, & Xuan, 2005). Conversely, alcohol advertising may enhance expectancies among young children, indicating a possible reciprocal relationship (Dunn & Yniguez, 1999).

Exhibiting sensation seeking personality traits is significantly associated with overall and heavy alcohol consumption (Stautz & Cooper, 2013), participation in drinking games (Diulio, Silvestri, & Correia, 2014; Johnson & Cropsey, 2000), and peak blood alcohol content (BAC) (Moser, Pearson, Hustad, & Borsari, 2014). Risky drinking patterns, such as participation in drinking games, mediate the relationship between sensation seeking and negative alcohol consequences (Jones, Chryssanthakis, & Groom, 2014), and alcohol-related consequences may be more prevalent among sensation seeking females compared to sensation seeking males (Turchik, Garske, Probst, & Irvin, 2010). Moreover, individuals exhibiting sensation seeking traits may be more receptive to alcohol marketing (McClure et al., 2016).

Delinquent behaviors, such as violence and drug use, have a complicated relationship with alcohol use since underage alcohol use is itself often considered a delinquent behavior. While there is some evidence that adolescents who exhibit delinquent behaviors are more likely to be current drinkers (Goldberg-Looney, Sánchez-San Segundo, Ferrer-Cascales, Albaladejo-Blazquez, & Perrin, 2016), this effect is likely reciprocal (Innamorati & Maniglio, 2015). The Australian Temperament Project suggested that not only is delinquent behavior in adolescence predictive of binge drinking later in life but also that binge drinking in adolescence is predictive of subsequent delinquent behavior (Miller et al., 2016). Nevertheless, it is clear that exhibiting delinquent behavior is positively associated with alcohol-related problems (Livingston & Room, 2009; Mason et al., 2010; Stafström, 2007), and delinquency in adolescence and problem drinking share many underlying psychosocial risk factors, including delinquent peers, parental alcohol dependence, school or educational factors, neighborhood characteristics, and impulsivity (Curcio, Mak, & George, 2013).

We hypothesize that individuals who have greater alcohol dependence severity, greater positive alcohol expectancies, high sensation seeking traits, and delinquency behaviors will perceive alcohol ads to be more appealing, will perceive more alcohol consumption in the ads, will be more likely to perceive such consumption levels as responsible, and less likely to perceive alcohol consumption depicted in the ads as excessive.

## Methods

This study is secondary data analysis to determine if populations defined by their psychological characteristics may be considered vulnerable to alcohol marketing, as defined by Babor et al. (2017).

### **Participant selection**

A convenience sample of 326 students were recruited in 2004 from two Connecticut colleges. The inclusion criterion was being a current student at either college. The exclusion criteria were being younger than 18 years old and not agreeing to sign the consent form.

### **Data collection**

Each participant completed a two-part survey. Part one contained questions on demographics, individual

alcohol use, alcohol dependence symptoms, sensation seeking behavior, delinquent behavior, and alcohol expectancies. Demographic questions included age, gender, race, and ethnicity. The 10-item AUDIT was used to assess severity of alcohol involvement ( $\alpha=0.83$ ) (Saunders, Aasland, Babor, de la Fuente, & Grant, 1993). Item scores were summed (possible range from 0 to 40) to classify individuals as low risk drinkers (scores from 0 to 7), hazardous drinkers (scores from 8 to 15), harmful drinkers (scores from 16 to 19), and those with possible alcohol dependence (scores  $\geq 20$ ) (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001). Alcohol dependence severity was measured using the Ethanol Dependence Syndrome Scale (EDSS), which consists of 16 items that represent five domains of alcohol dependence: salience of drinking, impaired control over drinking, tolerance, withdrawal, and withdrawal relief (Babor, 1996). Participants were asked to describe how often an event happened (e.g., “*Without realizing it, I ended up drinking more than I planned*”) in the past 12 months using a four-point Likert scale with the response categories of “Never,” “1–2 times per month,” “2 times per week,” and “daily or almost daily” ( $\alpha=0.86$ ).

Sensation seeking behavior was measured using the Thrill and Adventure Seeking sub-scale of the Sensation Seeking Scale (SSS-TAS) (Zuckerman, 1979). The SSS-TAS consisted of 10 pairs of phrases. One phrase described a desire to perform a sensation seeking behavior (i.e., “*I often wish I could be a mountain climber*”). The second phrase described disdain for the behavior (i.e., “*I can’t understand people who risk their necks climbing mountains*”). Participants were forced to select the phrase among each pair that best describes their likes and feelings. Delinquent behavior was measured using 26 items adapted from Wender (1971) and Tarter et al. (1985). Participants completed the questionnaire retrospectively, indicating if they experienced any of these behaviors (e.g., “*Got into fights*”) before they were 12-years-old. Behaviors before 12-years-old were assessed because that was the age cutoff used by the Diagnostic and Statistical Manual-IV-TR, which was in place at the time of the study, for conduct disorder symptoms. The response categories were “Never,” “Sometimes,” and “Frequently” ( $\alpha=0.89$ ). Alcohol expectancies were measured using 40 items representing eight subscales: global positive, social and physical pleasure, social expressiveness, sexual enhancement, power and aggression, tension reduction and relaxation, cognitive and physical impairment, and careless unconcern (George et al., 1995). Participants were asked to state

how each statement (e.g., “*Drinking makes me feel warm and flushed*”) describes themselves using seven-point Likert scales ranging from “*Strongly Disagree*” to “*Strongly Agree*” ( $\alpha = 0.96$ ).

During part two of the survey, each participant viewed five alcohol ads; four were broadcast on television and one was published in a magazine. Ad 1 (After College, TV ad) shows an older African-American man describing his life after graduating college to a younger African-American man while drinking Colt 45. Ad 2 (Noise Compliant, TV ad) shows a police officer investigating a party because of a noise complaint. Several young persons are depicted drinking Samuel Adams Light Beer. Ad 3 (Boat Trip, TV ad) shows young adults passing bottles of Skyy Blue to each other while lounging on a rapidly moving boat. Ad 4 (Poolroom Party, TV ad) depicts three young men taking over a pool hall in order to throw a party after being denied entrance to a nightclub. They are drinking Smirnoff Ice. Ad 5 (Stamp Collector, magazine ad) shows a man’s forearm bearing six nightclub stamps. He is holding a Smirnoff Ice bottle, and the tagline reads “4:06 A.M. We get past our sixth doorman of the evening.” The ads were selected to represent multiple violations of the 1997 U.S. Beer Institute Advertising and Marketing Code, which was the dominant marketing code for beer and malt liquor advertising at the time of data collection (Babor, Xuan, & Proctor, 2008). Violations included portraying excessive alcohol consumption, depicting irresponsible alcohol consumptions, using content that primarily appeals to minors, and associating alcohol with success, whether social, professional, educational, athletic, or financial. Violation status was determined in a previous study (Babor, Xuan, & Proctor, 2008).

Participants viewed videos of the television ads and a static image of the magazine ad through a laptop computer. Ads were viewed for an equivalent amount of time regardless of format to ensure consistency between exposures.

After viewing each ad, participants answered 48 questions about the ad. The questions were based on 1997 U.S. Beer Institute Advertising and Marketing Code and consisted of three distinct types of questions (Babor et al., 2008). First, five-point Likert scale questions that assessed the participant’s agreement or disagreement with a statement of fact or opinion (e.g., “*This ad shows drunk driving, or suggests that drunk drinking is acceptable.*”), with response options ranging from “*strongly disagree*” to “*strongly agree*,” were used. Five-point Likert scale questions were also used to determine the attractiveness of the ad to the

participant (e.g., “*How appealing is this ad to you?*”), with response options ranging from “*very unappealing*” to “*very appealing*”. Second, questions related to the attractiveness of the ad to particular age groups (e.g., “*This ad appeals primarily to people in which age group?*”) and drinking duration (e.g., “*For how long would you expect the people in this situation shown in this ad to be drinking?*”) were answered with specific response categories. Third, participants were asked to place numerical values on the age of the main character (e.g., “*How old do you think this person is?*”) and the number of drinks consumed based on the situation depicted in the ad (e.g., “*How many drinks do you estimate this person is likely to consume in the situation shown in the ad?*”).

### **Data analysis**

Four questions from part two of the study survey were selected as the dependent variables: “*This ad shows situations where people are drinking an alcoholic beverage excessively*” (excessive drinking), “*How many drinks do you estimate this person is likely to consume in the situation shown in the ad?*” (alcohol consumption), “*This ad shows situations where people are drinking alcohol responsibly*” (responsible drinking), and “*How appealing is this ad to you?*” (ad appeal). For the Likert scale item response options measuring excessive drinking, responsible drinking, and ad appeal, 1 equaled “*strongly disagree*” or “*very unappealing*” and 5 equaled “*strongly agree*” or “*very appealing*”. Three was the mid-point of the scale.

Excessive drinking, responsible drinking, and alcohol consumption were selected as dependent variables because they are indicative of perceived social norms regarding alcohol use, and high perceived alcohol use by peers has been linked to greater individual alcohol consumption (Borsari & Carey, 2001; Borsari & Carey, 2003). Social norms are also predictive of alcohol use after controlling for exposure to alcohol marketing (McClure, Stoolmiller, Tanski, Engels, & Sargent, 2013). Moreover, alcohol expectancies have been previously associated with perceptions of alcohol use in alcohol advertising (Proctor, Babor, & Xuan, 2005). Ad appeal was selected because previous research has associated ad appeal with excessive alcohol use (Noel, Babor, & Grady, 2018; Noel, Xuan, & Babor, 2018).

The independent variables were the composite scores on the EDSS, SSS-TAS, delinquent behavior scale, and alcohol expectancy scale. For the EDSS, the response categories were coded 0–4, and item-level scores were summed to produce a total value and a

value for each EDSS subscale. Responses to the SSS-TAS were dummy coded. Selection of the phrase in favor of the sensation seeking activity was coded as 1. Selection of the phrase against the sensation activity was coded as 0. The responses across items were then summed to create a composite score. Similarly, responses from the delinquent behavior questions were coded 0–3 and summed. Responses to the alcohol expectancy questionnaire were coded 0–6 and summed to create a total expectancy score and a score for each alcohol expectancy sub-scale.

Covariates included in the model were age, gender, race, ethnicity, and alcohol use. Gender was dummy coded (Female = 1). Due to low numbers of minority students, race was first dichotomized into White and non-White and then dummy coded (non-White = 1). Ethnicity was also dummy coded (Hispanic = 1). Alcohol use was defined using the AUDIT scores. Participants were first categorized into AUDIT risk categories (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001), then AUDIT risk categories were dichotomized and dummy coded (low risk drinkers = 0; hazardous drinkers, harmful drinkers, and possible alcohol dependence = 1). All non-low risk AUDIT categories imply non-low risk alcohol consumption. Non-low risk alcohol involvement based on AUDIT risk categories was previously associated with perceiving increased alcohol consumption in alcohol advertising and perceiving such consumption as responsible (Noel, Xuan, & Babor, 2018). Dichotomizing race and AUDIT risk categories was performed in a previous analysis of the dataset (Noel, Xuan, & Babor, 2018).

The analysis was conducted using two-level, within-person, random-intercept only hierarchical linear models with full maximum likelihood estimation. Level-1 was defined using ad-level data. Level-2 was defined using person-level data. EDSS, SSS-TAS, delinquent behavior, and alcohol expectancy scores were grand-mean centered and introduced into the model at Level-2. Age was also grand-mean centered and introduced at Level-2. Gender, race, ethnicity, and alcohol use were uncentered and introduced into the model at Level-2. There were no Level-1 variables.

$$Y_{ij} = \pi_{0j} + e_{ij}$$

$$\begin{aligned}\pi_{0j} = & \beta_{00} + \beta_{01}(\text{EDSS}) + \beta_{02}(\text{SSS} - \text{TAS}) \\ & + \beta_{03}(\text{Delinquent Behavior}) \\ & + \beta_{04}(\text{Alcohol Expectancies}) \\ & + \beta_{05}(\text{Age}) + \beta_{06}(\text{Gender}) + \beta_{07}(\text{Race}) \\ & + \beta_{08}(\text{Ethnicity}) + \beta_{09}(\text{AUDIT}) + r_{0i}\end{aligned}$$

Intra-class correlations (ICCs) were calculated for each dependent variable using the null model. Relative model fit was assessed using the Akaike Information Criterion (AIC), which favors more complex models, and the Bayesian Information Criterion (BIC), which favors less complex models. Statistical analysis was performed using HLM for Windows Version 7.01 (Scientific Software International, Inc., Skokie, IL). Alpha was set at 0.05 *a priori*.

## Results

The sample was primarily female (60.7%), White (56.4%), and non-Hispanic (81.6%) (Table 1). The average age was 23.7 years old, and a majority of participants were low-risk drinkers (57.7%). Summary statistics for the dependent measures have been published elsewhere (Noel, Xuan, & Babor, 2018). Briefly, across all ads, mean perceived alcohol consumption was 5.6 drinks per ad ( $SD = 3.8$ ), which meets the definition of binge drinking (NIAAA, 2004), and mean scores for ad appeal, perceptions of excessive drinking, and perceptions of responsible drinking were 2.9 ( $SD = 1.1$ ), 2.7 ( $SD = 1.3$ ), and 2.8 ( $SD = 1.0$ ), respectively.

After adjusting for age, gender, race, ethnicity, and AUDIT risk category, alcohol expectancies ( $p < .01$ ) were positively associated with ad appeal (Table 2). Each alcohol expectancy subscale was also positively associated with ad appeal ( $p$ 's = .002 to  $< .001$ ) (Table 3). Lower AIC and BIC values for the social and physical pleasure and social expressiveness subscales indicate better model fit compared with the model using the total expectancy score (Tables 2 and 3).

**Table 1.** Participant Characteristics ( $n = 326$ ).

Variable	Number (%)
Gender	
Male	128 (39.3)
Female	198 (60.7)
Race	
White	184 (56.4)
Non-white	142 (43.6)
Ethnicity	
Hispanic	60 (18.4)
Non-Hispanic	266 (81.6)
AUDIT Risk Category	
Low Risk	188 (57.7)
Non-Low-Risk	138 (42.3)
Mean (SD)	
Age (years)	23.7 (9.2)
Ethanol Dependence	2.92 (3.8)
Sensation Seeking	5.66 (2.7)
Delinquency	10.9 (7.1)
Alcohol Expectancies	111.7 (43.1)

**Table 2.** Hierarchical linear models describing perceptions of alcohol advertising.\*

Variable	Ad Appeal <sup>○</sup>	Responsible drinking <sup>○</sup>	Excessive drinking <sup>○</sup>	Alcohol consumption <sup>○</sup>
ICC	0.31	0.16	0.10	0.09
<b>Fixed Effects</b>				
Intercept ( $\beta_{00}$ )	2.74 (0.09) <sup>§</sup>	2.76 (0.07) <sup>§</sup>	2.61 (0.09) <sup>§</sup>	5.30 (0.24) <sup>§</sup>
EDSS ( $\beta_{01}$ )	0.02 (0.01)	0.02 (0.01) <sup>†</sup>	-0.02 (0.01)	0.05 (0.03)
SSS-TAS ( $\beta_{02}$ )	0.04 (0.01) <sup>‡</sup>	0.00 (0.01)	-0.02 (0.02)	0.02 (0.04)
Delinquent Behavior ( $\beta_{03}$ )	0.00 (0.01)	< 0.01 (< 0.01)	0.02 (0.01) <sup>§</sup>	0.02 (0.02)
Alcohol Expectancies ( $\beta_{04}$ )	0.01 (< 0.01) <sup>§</sup>	< 0.01 (< 0.01)	< 0.01 (< 0.01)	< 0.01 (< 0.01)
<b>Random Effects</b>				
Intercept ( $\tau$ )	0.268 <sup>§</sup>	0.081 <sup>§</sup>	0.214 <sup>§</sup>	1.027 <sup>§</sup>
<b>Model Fit</b>				
AIC	4750.8	4734.0	5389.9	8978.3
BIC	4796.3	4779.4	5435.3	9023.7

\*Models adjusted for age, gender, race, ethnicity, and AUDIT risk category;

<sup>○</sup> $\beta$  (SE);

<sup>§</sup> $p < .001$ ;

<sup>‡</sup> $p < .01$ ;

<sup>†</sup> $p < .05$ .

**Table 3.** Alcohol expectancy subscales associated with ad appeal.\*

Sub-Scale	Fixed Effects	Random Effects	Model Fit	
	Ad Appeal <sup>○</sup>	Intercept ( $\tau$ )	AIC	BIC
Global positive	0.03 (0.01) <sup>§</sup>	0.289 <sup>§</sup>	4766.2	4811.7
Social and physical pleasure	0.03 (0.01) <sup>§</sup>	0.257 <sup>§</sup>	4742.8	4788.2
Social expressiveness	0.03 (0.01) <sup>§</sup>	0.266 <sup>§</sup>	4749.3	4794.7
Sexual enhancement	0.03 (0.01) <sup>§</sup>	0.279 <sup>§</sup>	4758.6	4804.0
Power and aggression	0.02 (0.01) <sup>§</sup>	0.285 <sup>§</sup>	4763.3	4808.7
Tension reduction/relaxation	0.02 (0.01) <sup>‡</sup>	0.294 <sup>§</sup>	4769.5	4814.9
Cognitive/Physical Impairment	0.02 (0.01) <sup>‡</sup>	0.297 <sup>§</sup>	4771.1	4816.6
Careless unconcern	0.01 (0.01) <sup>‡</sup>	0.293 <sup>§</sup>	4768.7	4814.1

\*Models adjusted for age, gender, race, ethnicity, AUDIT risk category, EDSS, SSS-TAS, and delinquent behavior;

<sup>○</sup> $\beta$  (SE);

<sup>§</sup> $p < .001$ ;

<sup>‡</sup> $p < .01$ ;

<sup>†</sup> $p < .05$ .

The SSS-TAS ( $p = .004$ ) were positively associated with ad appeal, and delinquent behavior ( $p < .001$ ) was positively associated with perceptions of excessive drinking (Table 2). EDSS scores were positively associated with perceptions of responsible drinking ( $p = .035$ ). Specifically, the impaired control ( $p = .002$ ) and tolerance ( $p = .005$ ) subscales of the EDSS were positively associated with perceptions of responsible drinking (Table 4). When either subscale was used in the model, the model AIC and BIC values are lower than the AIC and BIC values when the total EDSS score is used (Tables 2 and 4). No psychological characteristics were associated with perceptions of total alcohol consumption ( $p$ 's = .129–.664) (Table 2).

## Discussion

The findings suggest that individuals with high alcohol expectancies, sensation seeking traits, and alcohol dependence symptoms may meet the second criterion for being considered vulnerable to alcohol marketing as defined by Babor et al. (2017). Ads are

**Table 4.** EDSS subscales associated with perceptions of responsible drinking.\*

Sub-Scale	Fixed Effects	Random Effects	Model Fit	
	Ad Appeal <sup>○</sup>	Intercept ( $\tau$ )	AIC	BIC
Salience of drink seeking	0.01 (0.05)	0.084 <sup>§</sup>	4738.2	4783.7
Impaired control	0.05 (0.02) <sup>†</sup>	0.081 <sup>§</sup>	4732.3	4777.8
Tolerance	0.04 (0.02) <sup>†</sup>	0.080 <sup>§</sup>	4732.8	4778.2
Withdrawal	-0.04 (0.05)	0.084 <sup>§</sup>	4737.5	4783.0
Withdrawal relief	0.01 (0.13)	0.084 <sup>§</sup>	4738.2	4783.7

\*Models adjusted for age, gender, race, ethnicity, AUDIT score, SSS-TAS, delinquent behavior, and alcohol expectancies;

<sup>○</sup> $\beta$  (SE);

<sup>§</sup> $p < .001$ ;

<sup>†</sup> $p < .01$ ;

<sup>‡</sup> $p < .05$ .

most appealing to those with high alcohol expectancies and sensation seeking traits, and excessive alcohol consumption was perceived as “responsible” by those with greater alcohol dependence scores. Among individuals with high expectancy scores, those with expectations of social and physical pleasure, as well as those with expectations of social expressiveness, may be particularly vulnerable to alcohol marketing messages. Among those who have greater alcohol dependence severity, those exhibiting symptoms of impaired control and tolerance may be particularly vulnerable.

Identifying individuals who have high alcohol expectancies for social and physical pleasure or social expressiveness as vulnerable may be important because many alcohol ads use social and physical success to promote alcohol use. Between November 1999 and April 2000, 39% of alcohol ads collected on television and in print used friendship as a means of appeal (Austin & Hust, 2005). Nearly 25% of ads used sex, and 23% of magazine ads depicted flirting, romancing, or sex. Among television alcohol ads broadcast between July 2009 and June 2011, 42% used messages that focused on partying, love, and sex (Morgenstern et al., 2015). The alcohol industry has voluntarily

prohibited the association of alcohol use with social, physical, or sexual success (IARD, 2011); however, such prohibitions are often violated. Among advertisements broadcast during U.S. men's and women's college basketball championship tournament games from 1999 to 2008, 39% associated alcohol use with social, physical, and/or sexual success (Babor, Xuan, Damon, & Noel, 2013), and alcohol brands popular among underage drinkers are more likely to air television advertising that violates the industry's voluntary code which proscribes youth-appealing content (Xuan, DeJong, Siegel, & Babor, 2017). Approximately 85% of alcohol ads broadcast in six countries during the 2014 FIFA World Cup Tournament violated guidelines intended to prevent associations between alcohol and social, physical, or sexual success (Noel, Babor, Robaina, Feulner, Vendrame, Monteiro, 2017), and 64% of Budweiser and Bud Light ads published on Facebook were reported to contain similar violations (Noel & Babor, 2017). Multiple studies from Australia have produced similar results (Donovan, Donovan, Howat, & Weller, 2007; Jones & Donovan, 2002; Jones, Gregory, & Munro, 2009; Jones, Phillipson & Barrie, 2009; Saunders & Yap, 1991).

Similarly, sensation seeking has been identified as a thematic element in numerous alcohol advertisements (Noel & Babor, 2017; Noel, Xuan, & Babor, 2018), and depictions of exciting lifestyles may specifically appeal to individuals with high sensation seeking characteristics. Moreover, an analysis of data collected for the Avon Longitudinal Study of Parents and Children concluded that sensation seeking was predictive of sports participation (Hallingberg, Van Goozen, & Moore, 2016), and sports are often associated with, and depicted within, alcohol advertising. Alcohol producers are sponsors of the four largest North American sports associations (i.e., the National Football League, Major League Baseball, the National Basketball Association, and the National Hockey League) and are sponsors of the FIFA World Cup Tournament and the Union of European Football Associations (Heitner, 2017; FIFA, 2018; Major League Baseball, 2016; National Hockey League, 2018; Schultz, 2015; TEAM Marketing, 2017). The use of sports within alcohol advertising has been documented in US television advertising, Australian television advertising, and Facebook advertising (Morgenstern et al., 2015; Noel & Babor, 2017; Pettigrew et al., 2012).

For individuals who exhibit alcohol dependence symptoms, those with symptoms of impaired control and tolerance may be vulnerable to depictions of

excessive alcohol consumption. In this study, impaired control referred to the inability to control one's own drinking behavior, and several content analyses of alcohol marketing indicate that excessive alcohol consumption is often portrayed in alcohol advertising (Morgenstern et al., 2015; Noel & Babor, 2017; Noel, Babor, Robaina, Feulner, et al., 2017; Smith, Cukier, & Jernigan, 2014; Zwarun & Farrar, 2005). For example, 39% of alcohol ads collected during the 2014 FIFA World Cup Tournament violated prohibitions intended to prevent the portrayal of excessive alcohol consumption (Noel, Babor, Robaina, Feulner, et al., 2017). Combined with the aforementioned associations between alcohol and success, these marketing messages may trigger preexisting notions that unabated alcohol consumption is accepted and necessary in social situations among individuals with impaired control and tolerance. The lack of depictions of drunkenness, despite high perceived alcohol consumption, in alcohol advertising may be responsible for the failure of individuals who score high on the EDSS tolerance subscale to perceive excessive alcohol consumption as irresponsible. Indeed, while depictions of excessive consumption is common, depictions of individuals who lose motor control due to excessive alcohol consumption is rare (e.g., Babor et al., 2013; Noel, Babor, & Robaina, 2017; Noel & Babor, 2017). The discontinuity between the action and the consequence may strengthen the idea that high alcohol consumption may not have negative consequences and that high tolerance to alcohol is a desirable trait.

Importantly, the psychological characteristics identified here are also known predictors of excessive alcohol consumption and negative alcohol-related health consequences. Alcohol expectancies have been positively associated with alcohol consumption in laboratory settings (Jones, Corbin, & Fromme, 2001), surveillance studies (Leigh & Stacy, 2004), and naturalistic settings (Bot, Engels, & Knibbe, 2005). Two meta-analyses have concluded that sensation seeking is positively associated with alcohol use (Hittner & Swickert, 2006; Stautz & Cooper, 2013), and other studies have concluded that sensation seeking is associated with earlier alcohol initiation and the development of alcohol use disorders (Bekman, Cummins, & Brown, 2010; Shin, Hong, & Jeon, 2012). Ethanol dependence has been linked with a higher odds of all-cause mortality (Dawson, 2000; John et al., 2013; Rehm, Shield, Gmel, Rehm, & Frick, 2013) and a cause of substantial disease burden (Chikritzhs, Jonas, Stockwell, Heale, & Dietze, 2001; Williams et al., 2018).

### Implications

The alcohol industry recognizes children and pregnant women as vulnerable to alcohol marketing and established specific protections from alcohol marketing practices for these subpopulations (IARD, 2011). No other subpopulations receive similar recognition. Using Babor et al.'s (2017) definition as a guide, previous research suggests that those with high alcohol expectancies, sensation seeking traits, and alcohol dependence symptoms satisfy the first criterion of being particularly susceptible to alcohol-related harm (Bekman, Cummins, & Brown, 2010; Bot, Engels, & Knibbe, 2005; Chikritzhs, Jonas, Stockwell, Heale, & Dietze, 2001; Dawson, 2000; Hittner & Swickert, 2006; John et al., 2013; Jones, Corbin, & Fromme, 2001; Leigh & Stacy, 2004; Rehm, Shield, Gmel, Rehm, & Frick, 2013; Shin, Hong, & Jeon, 2012; Stautz & Cooper, 2013; Williams et al., 2018). The present results suggest that individuals with these characteristics may also satisfy Babor et al.'s (2017) second criterion. If confirmed, the regulations governing alcohol marketing practices may need to expand their population coverage, with the direct implication that they should protect adults with certain vulnerability characteristics, in addition to those who are underage.

How alcohol marketing regulations protect vulnerable groups is a subject of debate, but in the absence of a complete ban on alcohol marketing, experts recommend implementing regulations similar to France's Loi Evin, which limits alcohol marketing to elements related to the brand name, the producer, and product qualities (Babor, Jernigan, Brookes, & Brown, 2017). The ability to associate alcohol or alcohol use with success or sensation seeking activities thus becomes impossible. Regardless of the system used, the protection of vulnerable groups will not be realized without strong implementation and enforcement. Indeed, alcohol advertising appeal can be significantly reduced when alcohol marketing regulations are rigorously adhered to (Noel, Babor, & Grady, 2018).

### Limitations

There are several limitations to this study. The study is a secondary analysis, and the data collected was cross-sectional in nature. Causal pathways cannot be determined, and more research is needed to confirm the present findings. The ads used in the study were not selected at random, and ad perceptions may differ when using ads that are compliant with a relevant alcohol marketing code, which limits the generalizability of the findings, although recent analyses of alcohol

marketing materials indicates that noncompliance is highly prevalent (Noel, Babor, & Robaina, 2017). The ads used were produced and broadcast in the early 2000s, and it is possible that the content of alcohol marketing has changed over time. However, several content analyses indicate that the general themes used in alcohol marketing have been constant despite changes in the creative elements of the materials (Noel, Babor, & Robaina, 2017). Alcohol ads today are also viewed on multiple platforms, and conclusions based on television or magazine advertisements, which were used here, may not be applicable to new media formats (e.g., websites and social networking sites). Moreover, because all participants viewed the ads in the same order, order effects may partially explain the results, and respondent fatigue may have occurred, which would have limited the impact of later appearing ads compared to earlier appearing ads.

Study participants were recruited as a convenience sample at one university and one community college in the northeast U.S. Thus, study participants may not represent the entire U.S. college population. For instance, the sample contained a high proportion of individuals who were classified as non-low-risk drinkers, which may be due to recruiting at a community college (Chen & Paschall, 2003). Study participants were also directed to view the ads within the context of a research study and perceptions may differ when viewing alcohol ads in a natural setting. Finally, the study also relied on self-reported measures, and it is possible social desirability bias caused participants to underreport undesirable characteristics and over-report desirable characteristics, although such biases may have only had a limited impact because a high proportion of participants reported non-low-risk alcohol use.

### Conclusions

Individuals with high positive alcohol expectancies and sensation seeking traits may perceive alcohol advertising to be more appealing, and drinkers with alcohol dependence symptoms may perceive excessive alcohol consumption depicted in alcohol ads as responsible. These individuals may be particularly vulnerable to alcohol marketing practices, which, when combined with research indicating an increased risk of harm from alcohol use, suggests that specific protections from alcohol marketing for these population sub-groups should be considered.

## Disclosure statement

The authors report no conflicts of interest.

## Funding

This work was supported by the National Institute on Alcohol Abuse and Alcoholism at the (R21 AA013530) and the Beever Trust Fund. The sources of funding had no further role in study design; in the collection, analysis and interpretation of data; in the writing of the report; or in the decision to submit the paper for publication.

## References

- Austin, E. W., & Hust, S. J. (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(8), 769–785. doi:10.1080/10810730500326757
- Babor, T. F. (1996). Reliability of the ethanol dependence syndrome scale. *Psychology of Addictive Behaviors*, 10(2), 97–103. doi:10.1037/0893-164X.10.2.97
- Babor, T. F., Higgins-Biddle, J. C., Saunders, J. B., & Monteiro, M. G. (2001). *The Alcohol use disorders identification test: Guidelines for use in primary care* (2nd ed.). Geneva, Switzerland: World Health Organization. Retrieved from [http://www.talkingalcohol.com/files/pdfs/WHO\\_audit.pdf](http://www.talkingalcohol.com/files/pdfs/WHO_audit.pdf). Accessed 20 January 2016.
- Babor, T. F., Jernigan, D., Brookes, C., & Brown, K. (2017). Toward a public health approach to the protection of vulnerable populations from the harmful effects of alcohol marketing. *Addiction*, 112(S1), 125–127. doi:10.1111/add.13682
- Babor, T. F., Robaina, K., Noel, J. K., & Ritson, E. B. (2017). Vulnerability to alcohol-related problems: A policy brief with implications for the regulation of alcohol marketing. *Addiction*, 112(S1), 94–101. doi:10.1111/add.13626
- Babor, T. F., Xuan, Z., & Proctor, D. (2008). Reliability of a rating procedure to monitor industry self-regulation codes governing alcohol advertising content. *Journal of Studies on Alcohol and Drugs*, 69(2), 235–242. doi:10.15288/jasad.2008.69.235
- Babor, T. F., Xuan, Z., Damon, D., & Noel, J. (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(10), e45–e51. doi:10.2105/AJPH.2013.301487
- Barr, H. M., Bookstein, F. L., O'Malley, K. D., Connor, P. D., Huggins, J. E., & Streissguth, A. P. (2006). Binge drinking during pregnancy as a predictor of psychiatric disorders on the structured clinical interview for DSM-IV in young adult offspring. *American Journal of Psychiatry*, 163(6), 1061–1065. doi:10.1176/ajp.2006.163.6.1061
- Barr, H. M., & Streissguth, A. P. (2001). Identifying maternal self-reported alcohol use associated with fetal alcohol spectrum disorders. *Alcoholism: Clinical & Experimental Research*, 25(2), 283–287. doi:10.1097/00000374-200102000-00018
- Bava, S., & Tapert, S. F. (2010). Adolescent brain development and the risk for alcohol and other drug problems. *Neuropsychology Review*, 20(4), 398–413. doi:10.1007/s11065-010-9146-6
- Bekman, N. M., Cummins, K., & Brown, S. A. (2010). Affective and personality risk and cognitive mediators of initial adolescent alcohol use. *Journal of Studies on Alcohol and Drugs*, 71(4), 570–580.
- Borsari, B., & Carey, K. B. (2001). Peer influences on college drinking: A review of the research. *Journal of Substance Abuse*, 13(4), 391–424.
- Borsari, B., & Carey, K. B. (2003). Descriptive and injunctive norms in college drinking: A meta-analytic integration. *Journal of Studies on Alcohol*, 64(3), 331–341. doi:10.15288/jsa.2003.64.331
- Bot, S. M., Engels, R. C. M. E., & Knibbe, R. A. (2005). The effects of alcohol expectancies on drinking behaviour in peer groups: Observations in a naturalistic setting. *Addiction*, 100(9), 1270–1279. doi:10.1111/j.1360-0443.2005.01152.x
- Chen, M., & Paschall, M. (2003). Malt liquor use, heavy/problem drinking and other problem behaviors in a sample of community college students. *Journal of Studies on Alcohol*, 64(6), 835–842. doi:10.15288/jsa.2003.64.835
- Chikritzhs, T. N., Jonas, H. A., Stockwell, T. R., Heale, P. F., & Dietze, P. M. (2001). Mortality and life-years lost due to alcohol: A comparison of acute and chronic causes. *The Medical Journal of Australia*, 174(6), 281–284.
- Curcio, A. L., Mak, A. S., & George, A. M. (2013). Do adolescent delinquency and problem drinking share psychosocial risk factors? A literature review. *Addictive Behaviors*, 38(4), 2003–2013. doi:10.1016/j.addbeh.2012.12.004
- Dager, A. D., Anderson, B. M., Rosen, R., Khadka, S., Sawyer, B., Jiantonio-Kelly, R. E., ... Pearlson, G. D. (2014). Functional magnetic resonance imaging (fMRI) response to alcohol pictures predicts subsequent transition to heavy drinking in college students. *Addiction*, 109(4), 585–595. doi:10.1111/add.12437
- Dawson, D. A. (2000). Alcohol consumption, alcohol dependence, and all-cause mortality. *Alcoholism: Clinical and Experimental Research*, 24(1), 72–81. doi:10.1111/j.1530-0277.2000.tb04556.x
- Diulio, A. R., Silvestri, M. M., & Correia, C. J. (2014). The role of personality variables in drinking game participation. *Addictive Behaviors*, 39(7), 1159–1162.
- Donovan, K., Donovan, R., Howat, P., & Weller, N. (2007). Magazine alcohol advertising compliance with the Australian Alcoholic Beverages Advertising Code. *Drug and Alcohol Review*, 26(1), 73–81. doi:10.1080/09595230601037026
- Dunn, M. E., & Yniguez, R. M. (1999). Experimental demonstration of the influence of alcohol advertising on the activation of alcohol expectancies in memory among fourth- and fifth-grade children. *Experimental and Clinical Psychopharmacology*, 7(4), 473–483. doi:10.1037//1064-1297.7.4.473
- FIFA. (2018). Marketing. Retrieved from <https://www.fifa.com/worldcup/organisation/partners/>.
- Garland, E. L., Franken, I. H., & Howard, M. O. (2012). Cue-elicited heart rate variability and attentional bias predict alcohol relapse following treatment.

- Psychopharmacology (Berl)*, 222(1), 17–26. doi:10.1007/s00213-011-2618-4
- George, W. H., Frone, M. R., Cooper, M. L., Russell, M., Skinner, J. B., & Windle, M. (1995). A revised alcohol expectancy questionnaire: Factor structure confirmation and invariance in a general population sample. *Journal of Studies on Alcohol*, 56(2), 177–185. doi:10.15288/jsa.1995.56.177
- Glanton, C. F., & Wulfert, E. (2013). The relationship between parental alcohol use and college students' alcohol-related cognitions. *Addictive Behaviors*, 38(11), 2761–2767. doi:10.1016/j.addbeh.2013.07.011
- Goldberg-Looney, L. D., Sánchez-San Segundo, M., Ferrer-Cascales, R., Albaladejo-Blazquez, N., & Perrin, P. B. (2016). Adolescent alcohol use in Spain: Connections with friends, school, and other delinquent behaviors. *Frontiers in Psychology*, 7, 269.
- Hallingberg, B. E., Van Goozen, S. H. M., & Moore, S. C. (2016). Characteristics associated with risk taking behaviours predict young people's participation in organised activities. *Journal of Adolescence*, 53, 189–194. doi:10.1016/j.adolescence.2016.10.008.
- Harris, J. L., & Graff, S. K. (2011). Protecting children from harmful food marketing: options for local government to make a difference. *Preventing Chronic Disease*, 8(5), A92.
- Heitner, D. (2017). NFL sponsorship soars to \$1.25 billion, Up 4.3% Year-Over-Year. *Forbes*. Retrieved from <https://www.forbes.com/sites/darrenheitner/2017/03/08/nfl-sponsorship-soars-to-1-25-billion-up-4-3-year-over-year/#710006dc21b1>
- Henderson, J., Kesmodel, U., & Gray, R. (2007). Systematic review of the fetal effects of prenatal binge-drinking. *Journal of Epidemiology and Community Health*, 61(12), 1069–1073. doi:10.1136/jech.2006.054213
- Hittner, J. B., & Swickert, R. (2006). Sensation seeking and alcohol use: A meta-analytic review. *Addictive Behaviors*, 31(8), 1383–1401.
- Innamorati, M., & Maniglio, R. (2015). Psychosocial correlates of alcohol use and heavy episodic drinking among Italian adolescents: Data from the second International Self-Reported Delinquency study. *The American Journal on Addictions*, 24(6), 507–514. doi:10.1111/ajad.12239
- Institute of Medicine. (2004). *Food marketing to children and youth: threat or opportunity?* Washington, DC: The National Academies Press. Retrieved from: <https://www.nap.edu/catalog/11514/food-marketing-to-children-and-youth-threat-or-opportunity>
- International Alliance for Responsible Drinking (IARD). (2011). Guiding principles: Self-regulation of marketing communications for beverage alcohol. Retrieved from <http://www.iard.org/wp-content/uploads/2016/01/Guiding-Principles.pdf>.
- John, U., Rumpf, H.-J., Bischof, G., Hapke, U., Hanke, M., & Meyer, C. (2013). Excess mortality of alcohol-dependent individuals after 14 years and mortality predictors based on treatment participation and severity of alcohol dependence. *Alcoholism: Clinical and Experimental Research*, 37(1), 156–163. doi:10.1111/j.1530-0277.2012.01863.x
- Johnson, T. J., & Cropsey, K. L. (2000). Sensation seeking and drinking game participation in heavy-drinking college students. *Addictive Behaviors*, 25(1), 109–116. doi:10.1016/S0306-4603(98)00118-X
- Jones, B. T., Corbin, W., & Fromme, K. (2001). A review of expectancy theory and alcohol consumption. *Addiction*, 96(1), 57–72. doi:10.1046/j.1360-0443.2001.961575.x
- Jones, K. A., Chryssanthakis, A., & Groom, M. J. (2014). Impulsivity and drinking motives predict problem behaviours relating to alcohol use in university students. *Addictive Behaviors*, 39(1), 289–296. doi:10.1016/j.addbeh.2013.10.024
- Jones, S. C., & Donovan, R. J. (2002). Self-regulation of alcohol advertising: is it working for Australia? *Journal of Public Affairs*, 2(3), 153–165. doi:10.1002/pa.105
- Jones, S. C., Gregory, P., & Munro, G. (2009). Adolescent and young adult perceptions of Australian alcohol advertisements. *Journal of Substance Use*, 14(6), 335–352. doi:10.3109/14659890802654524
- Jones, S. C., Phillipson, L., Barrie, L. (2009). '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(1-2), 59–73. doi:10.1002/pa.340
- Leigh, B. C., & Stacy, A. W. (2004). Alcohol expectancies and drinking in different age groups. *Addiction (Abingdon, England)*, 99(2), 215–227.
- Lewis, S. J., Zuccolo, L., Davey Smith, G., Macleod, J., Rodriguez, S., Draper, E. S., ... Gray, R. (2012). Fetal alcohol exposure and IQ at age 8: Evidence from a population-based birth-cohort study. *PLoS One*, 7(11), e49407. doi:10.1371/journal.pone.0049407
- Livingston, M., & Room, R. (2009). Variations by age and sex in alcohol-related problematic behaviour per drinking volume and heavier drinking occasion. *Drug and Alcohol Dependence*, 101(3), 169–175. doi:10.1016/j.drugalcdep.2008.12.014
- MacKillop, J., O'Hagen, S., Lisman, S. A., Murphy, J. G., Ray, L. A., Tidey, J. W., ... Monti, P. M. (2010). Behavioral economic analysis of cue-elicited craving for alcohol. *Addiction*, 105(9), 1599–1607. doi:10.1111/j.1360-0443.2010.03004.x
- Major League Baseball. (2016). Official sponsors of Major League Baseball. Retrieved from [http://mlb.mlb.com/mlb/official\\_info/official\\_sponsors.jsp](http://mlb.mlb.com/mlb/official_info/official_sponsors.jsp).
- Martino, S. C., Collins, R. L., Ellickson, P. L., Schell, T. L., & McCaffrey, D. (2006). Socio-environmental influences on adolescents' alcohol outcome expectancies: a prospective analysis. *Addiction*, 101(7), 971–983. doi:10.1111/j.1360-0443.2006.01445.x
- Mason, W. A., Hitch, J. E., Kosterman, R., McCarty, C. A., Herrenkohl, T., & Hawkins, J. D. (2010). Growth in adolescent delinquency and alcohol use in relation to young adult crime, alcohol use disorders, and risky sex: a comparison of youth from low- versus middle-income backgrounds. *Journal of Child Psychology and Psychiatry*, 51(12), 1377–1385. doi:10.1111/j.1469-7610.2010.02292.x
- McClure, A. C., Stoolmiller, M., Tanski, S. E., Engels, R. C. M. E., & Sargent, J. D. (2013). Alcohol marketing receptivity, marketing-specific cognitions and underage binge drinking. *Alcoholism: Clinical and Experimental Research*, 37(Suppl 1), e404–e413. doi:10.1111/j.1530-0277.2012.01932.x
- McClure, A. C., Tanski, S. E., Li, Z., Jackson, K., Morgenstern, M., Li, Z., & Sargent, J. D. (2016). Internet alcohol marketing and underage alcohol use. *Pediatrics*, 137(2), e20152149

- Miller, P. G., Butler, E., Richardson, B., Staiger, P. K., Youssef, G. J., Macdonald, J. A., ... Olsson, C. A. (2016). Relationships between problematic alcohol consumption and delinquent behaviour from adolescence to young adulthood. *Drug and Alcohol Review*, 35(3), 317–325. doi: [10.1111/dar.12345](https://doi.org/10.1111/dar.12345)
- Morgenstern, M., Schoeppe, F., Campbell, J., Braam, M. W., Stoolmiller, M., & Sargent, J. D. (2015). Content themes of alcohol advertising in U.S. television-latent class analysis. *Alcoholism: Clinical and Experimental Research*, 39(9), 1766–1774. doi: [10.1111/acer.12811](https://doi.org/10.1111/acer.12811)
- Moser, K., Pearson, M. R., Hustad, J. T., & Borsari, B. (2014). Drinking games, tailgating, and pregaming: pre-college predictors of risky college drinking. *American Journal of Drug and Alcohol Abuse*, 40(5), 367–373. doi: [10.3109/00952990.2014.936443](https://doi.org/10.3109/00952990.2014.936443)
- Murray, J., Burgess, S., Zuccolo, L., Hickman, M., Gray, R., & Lewis, S. J. (2016). Moderate alcohol drinking in pregnancy increases risk for children's persistent conduct problems: causal effects in a Mendelian randomisation study. *Journal of Child Psychology and Psychiatry*, 57(5), 575–584. doi: [10.1111/jcpp.12486](https://doi.org/10.1111/jcpp.12486)
- National Hockey League. (2018). NHL corporate marketing partners. Retrieved from <https://www.nhl.com/info/corporate-marketing-partners>.
- National Institute on Alcohol Abuse and Alcoholism (NIAAA). (2000). Tenth special report to the U.S. Congress on alcohol and health. Bethesda, MD: National Institutes of Health. Retrieved from <http://pubs.niaaa.nih.gov/publications/10Report/10thSpecialReport.pdf>.
- National Institute of Alcohol Abuse and Alcoholism (NIAAA). (2004). NIAAA council approves definition of binge drinking. NIAAA Newsletter, 3, 3. Retrieved from [https://pubs.niaaa.nih.gov/publications/Newsletter/winter2004/Newsletter\\_Number3.pdf](https://pubs.niaaa.nih.gov/publications/Newsletter/winter2004/Newsletter_Number3.pdf).
- Noel, J. K., & Babor, T. F. (2017). Predicting regulatory compliance in beer advertising on Facebook. *Alcohol and Alcoholism (Oxford, Oxfordshire)*, 52(6), 730–736.
- Noel, J. K., Babor, T. F., & Grady, J. J. (2018). Advertising content, platform characteristics, and the appeal of beer advertising on a social networking site. *Alcohol and Alcoholism*, 53(5), 619–625. doi: [10.1093/alcalc/agy020](https://doi.org/10.1093/alcalc/agy020)
- Noel, J. K., Babor, T. F., & Robaina, K. (2017). Industry self-regulation of alcohol marketing: A systematic review of content and exposure research. *Addiction*, 112(Suppl 1), 28–50. doi: [10.1111/add.13410](https://doi.org/10.1111/add.13410)
- Noel, J. K., Babor, T. F., Robaina, K., Feulner, M., Vendrame, A., & Monteiro, M. (2017). Alcohol marketing in the Americas and Spain during the 2014 FIFA World Cup Tournament. *Addiction*, 112 (Suppl 1), 64–73. doi: [10.1111/add.13487](https://doi.org/10.1111/add.13487)
- Noel, J. K., Xuan, Z., & Babor, T. F. (2018). Perceptions of alcohol advertising among high risk drinkers. *Substance Use & Misuse*, 53(9), 1403–1410. doi: [10.1080/10826084.2017.1409765](https://doi.org/10.1080/10826084.2017.1409765)
- Pechmann, C., Levine, L., Loughlin, S., & Leslie, F. (2005). Impulsive and self-conscious: adolescents' vulnerability to advertising and promotion. *Journal of Public Policy & Marketing*, 24, 202–221. doi: [10.1509/jppm.2005.24.2.202](https://doi.org/10.1509/jppm.2005.24.2.202)
- Pettigrew, S., Roberts, M., Pescud, M., Chapman, K., Quester, P., & Miller, C. (2012). The extent and nature of alcohol advertising on Australian television. *Drug and Alcohol Review*, 31(6), 797–802. doi: [10.1111/j.1465-3362.2012.00439.x](https://doi.org/10.1111/j.1465-3362.2012.00439.x)
- Proctor, D. C., Babor, T. F., & Xuan, Z. (2005). Effects of cautionary messages and vulnerability factors on viewers' perceptions of alcohol advertisements. *Journal of Studies on Alcohol*, 66(5), 648–657. doi: [10.15288/jsa.2005.66.648](https://doi.org/10.15288/jsa.2005.66.648)
- Rehm, J., Shield, K. D., Gmel, G., Rehm, M. X., & Frick, U. (2013). Modeling the impact of alcohol dependence on mortality burden and the effect of available treatment interventions in the European Union. *European Neuropsychopharmacology*, 23(2), 89–97. doi: [10.1016/j.euroneuro.2012.08.001](https://doi.org/10.1016/j.euroneuro.2012.08.001)
- Saunders, J. B., Aasland, O. G., Babor, T. F., de la Fuente, J. R., & Grant, M. (1993). Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption-II. *Addiction*, 88(6), 791–804. doi: [10.1111/j.1360-0443.1993.tb02093.x](https://doi.org/10.1111/j.1360-0443.1993.tb02093.x)
- Saunders, B., & Yap, E. (1991). Do our guardians need guarding? An examination of the Australian system of self-regulation of alcohol advertising. *Drug and Alcohol Review*, 10(1), 15–27.
- Schulte, M. T., Ramo, D., & Brown, S. A. (2009). Gender differences in factors influencing alcohol use and drinking progression among adolescents. *Clinical Psychology Review*, 29(6), 535–547. doi: [10.1016/j.cpr.2009.06.003](https://doi.org/10.1016/j.cpr.2009.06.003)
- Schultz, E. J. (2015). A-B InBev extends NBA sponsorship, gains content rights. Ad Age. Retrieved from <http://adage.com/article/cmo-strategy/a-b-inbev-extends-nba-sponsorship-gains-content-rights/301547/>.
- Scott-Sheldon, L. A., Terry, D. L., Carey, K. B., Garey, L., & Carey, M. P. (2012). Efficacy of expectancy challenge interventions to reduce college student drinking: a meta-analytic review. *Psychology of Addictive Behaviors*, 26(3), 393–405. doi: [10.1037/a0027565](https://doi.org/10.1037/a0027565)
- Shin, S. H., Hong, H. G., & Jeon, S.-M. (2012). Personality and alcohol use: The role of impulsivity. *Addictive Behaviors*, 37(1), 102–107.
- Sjoerds, Z., van den Brink, W., Beekman, A. T., Penninx, B. W., & Veltman, D. J. (2014). Cue reactivity is associated with duration and severity of alcohol dependence: an fMRI study. *PLoS One*, 9(1), e84560.
- Smith, K. C., Cukier, S., & Jernigan, D. H. (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(10), 1901–1911. doi: [10.2105/AJPH.2013.301483](https://doi.org/10.2105/AJPH.2013.301483)
- Sokol, R. J., Delaney-Black, V., & Nordstrom, B. (2003). Fetal alcohol spectrum disorder. *JAMA*, 290, 2296–2299.
- Stafström, M. (2007). Kick back and destroy the ride: alcohol-related violence and associations with drinking patterns and delinquency in adolescence. *Substance Abuse Treatment, Prevention, and Policy*, 2(1), 18. doi: [10.1186/1747-597X-2-18](https://doi.org/10.1186/1747-597X-2-18)
- Stautz, K., & Cooper, A. (2013). Impulsivity-related personality traits and adolescent alcohol use: a meta-analytic review. *Clinical Psychology Review*, 33(4), 574–592.
- Stautz, K., Frings, D., Albery, I. P., Moss, A. C., & Marteau, T. M. (2017). Impact of alcohol-promoting and alcohol-warning advertisements on alcohol consumption, affect, and implicit cognition in heavy-drinking young adults: A

- laboratory-based randomized controlled trial. *British Journal of Health Psychology*, 22 (1), 128–150. doi: [10.1111/bjhp.12221](https://doi.org/10.1111/bjhp.12221)
- Tarter, R. E., Hegedus, A. M., & Gavaler, J. S. (1985). Hyperactivity in sons of alcoholics. *Journal of Studies on Alcohol*, 46(3), 259–261.
- TEAM Marketing. (2017). HEINEKEN extends UEFA club competition sponsorship. United European Football Association. Retrieved from <https://www.uefa.com/insideuefa/mediaservices/newsid=2438381.html#/>.
- Thomas, S. E., Drobis, D. J., & Deas, D. (2005). Alcohol cue reactivity in alcohol-dependent adolescents. *Journal of Studies on Alcohol*, 66(3), 354–360.
- Treise, D. M., Taylor, R. E., & Wells, L. G. (1995). How recovering alcoholics interpret alcoholic-beverage advertising. *Health Marketing Quarterly*, 12(2), 125–139. doi: [10.1300/J026v12n02\\_10](https://doi.org/10.1300/J026v12n02_10)
- Turchik, J. A., Garske, J. P., Probst, D. R., & Irvin, C. R. (2010). Personality, sexuality, and substance use as predictors of sexual risk taking in college students. *Journal of Sex Research*, 47(5), 411–419.
- Welch, K. A., Carson, A., & Lawrie, S. M. (2013). Brain structure in Adolescents and young adults with alcohol problems: systematic review of imaging studies. *Alcohol and Alcoholism*, 48(4), 433–444. doi: [10.1093/alcalc/agt037](https://doi.org/10.1093/alcalc/agt037)
- Wender, P. H. (1971). *Minimal brain dysfunction in children*. New York: John Wiley & Sons, Inc.
- Williams, R., Alexander, G., Armstrong, I., Baker, A., Bhala, N., Camps-Walsh, G., ... Yeoman, A. (2018). Disease burden and costs from excess alcohol consumption, obesity, and viral hepatitis: fourth report of the Lancet Standing Commission on Liver Disease in the UK. *The Lancet*, 391(10125), 1097–1107. doi: [10.1016/S0140-6736\(17\)32866-0](https://doi.org/10.1016/S0140-6736(17)32866-0)
- Xuan, Z., DeJong, W., Siegel, M., & Babor, T. F. (2017). Malt beverage brand popularity among youth and youth-appealing advertising content. *Alcoholism: Clinical and Experimental Research*, 41(11), 1946–1952. doi: [10.1111/acer.13487](https://doi.org/10.1111/acer.13487)
- Zuccolo, L., Lewis, S. J., Davey Smith, G., Sayal, K., Draper, E. S., Fraser, R., ... Gray, R. (2013). Prenatal alcohol exposure and offspring cognition and school performance. A ‘Mendelian randomization’ natural experiment. *International Journal of Epidemiology*, 42(5), 1358–1370. doi: [10.1093/ije/dyt172](https://doi.org/10.1093/ije/dyt172)
- Zuckerman, M. (1979). *Sensation seeking: Beyond the optimal level of arousal*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Zwarun, L., & Farrar, K. M. (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(4), 347–371. doi: [10.1207/s15327825mcs0804\\_4](https://doi.org/10.1207/s15327825mcs0804_4)