Youth Cognitive Responses to Alcohol Promotional Messaging: A Systematic Review

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ABSTRACT. Objective: This review examines the research of the effects of alcohol advertising on the cognitive mechanisms that precede underage alcohol use. Method: Using PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines, we reviewed 22 studies (1988–2016) selected from 22,040 articles. The final sample assessed cognitive responses of youth younger than the legal purchase age who were exposed to alcohol advertisements from television or magazines. Results: The studies were predominantly cross-sectional (59.1%), used convenience sampling (63.6%), had 74 to 3,521 participants, and were from six countries. The most common methods and applied theories for assessing advertising effects on cognitions were linear methods based on priming and modeling theories, and structural equation modeling based on information-processing models. Overall, advertising content appealed to youth, particularly advertisements that emphasized lifestyles of drinkers rather than the product quality. Youth exposed to alcohol advertisements were more likely to associate positive and arousing effects with alcohol, and in some studies effects were modified by sex, alcohol use, and age. Residual confounding and selection bias were concerns in the majority of studies. Conclusions: Exposure to alcohol advertising may affect underage perceptions of risks and rewards of alcohol use. Nevertheless, the ability to draw causal conclusions is limited because of study designs. Future studies should use nonlinear methods to assess the association between advertising and cognitions and avoid measuring alcohol advertising as a uniform and dose-response exposure among diverse populations. Future research would be strengthened by applying consistent theoretical frameworks, improving control for confounding bias, and using validated cognitive outcome measures. (J Stud Alcohol Drugs Supplement 19, 26–41, 2020)

ALCOHOL CONSUMPTION is one of the largest modifiable risk factors for death and disability among persons ages 15–29 (Rehm et al., 2009). Alcohol consumption among youth and young adults has been associated with prescription drug misuse, violence, injury, and suicide attempts (Borowsky et al., 2001; Hermos et al., 2008; Miller et al., 2007). Studies have shown that the earlier a young person begins to consume alcohol, the greater the risk is for these outcomes (Hermos et al., 2008; Hingson & Zha, 2009).

There is growing evidence that media portrayals serve as appealing role models for youth (McCreanor et al., 2005). Companies spend extensively on research and communications to imbue their products with brand identities that focus more on characteristics of the consumer rather than the product itself. For example, Captain Morgan Rum has promoted its product as the preferred beverage for people with an “adventurous spirit” (Captain Morgan Rum, 2018). By contrast, 1800 Silver Tequila is for someone who is sophisticated but a bit edgy or “just refined enough” as described through the brand’s promotional messages (1800 Tequila, 2018). Brand identities promoted through advertisements have been suggested as a source of models that youth emulate (McCreanor et al., 2005).

Many studies have hypothesized that youth drinking behaviors are associated with advertising exposure by way of shifting attitudes and beliefs about the benefits of drinking (Fleming et al., 2004). Information-processing models, such as the Message Interpretation Process, state that emotionally dominated mediators and moderators influence the strength of the association between advertising exposure and drinking-related behaviors (Austin et al., 2006). The Message Interpretation Process model specifies that the viewer must engage with the content, find the content desirable, and wish to emulate it in order for alcohol advertising to set expectations of certain benefits from drinking behaviors (Austin et al., 2006). Alternatively, priming theory suggests that exposure to alcohol advertisements can create positive associations in the viewer’s memory such that these associations are more readily accessible when making future judgments (Roskos-Ewoldsen & Roskos-Ewoldsen, 2009). To our knowledge, there has been no systematic review of the association between alcohol advertising content and cognitive changes among youth.

In this article, we set out to systematically review research that has explored youth cognitive responses to advertising to analyze the underlying theories, summarize the findings, and conclude with implications for future research.
Method

Databases, search strategy

As described in the introductory article in this supplement, we conducted an initial systematic review of 27,351 articles containing “alcohol” and “marketing” concepts, followed by a secondary review of 3,457 articles containing “content analysis,” “alcohol,” and “marketing” concepts (Sargent et al., 2020—this issue). Duplicates within search results were removed and a net of 22,040 articles remained.

After two rounds of screening by the project coordination team, 937 titles remained that were eligible for inclusion in this chapter. A net of 388 articles remained after excluding theses, non–peer-reviewed research articles, articles that were not related to alcohol advertising, articles not published in English, and remaining duplicates.

Inclusion criteria

Studies included in the review met the following criteria: (a) advertising exposures comprised alcohol advertisements from television or magazines, (b) participants were exposed to advertisements in the study such that outcomes were not based on recall only, (c) outcomes measured cognitive responses to alcohol advertisements, (d) the study population was below the legal purchase age based on country-specific regulations (variations by country were taken into consideration), (e) the studies were original research and not reviews, and (f) they contained statistical analyses beyond simple descriptive or qualitative methods.

The inclusion criteria were applied in two stages (Figure 1). A total of 77 eligible papers met the first screening criteria (a–c). As shown in Figure 1, these eligible studies were then filtered through more specific inclusion criteria (d–f).

Twenty-two studies met all the eligibility criteria (a–f) and were included in the analysis.

Data coding and assessment of study quality

Researchers developed a data collection form to categorize data from each study. The data collection categories included: design and implementation methods (e.g., study design, setting, sample size, sample demographics, theory, data collection method, and statistical method type); exposure type (e.g., source, control, content, and brand); cognitive outcome assessment methods; and results. Data were reviewed and entered in four waves. The first review focused on study design, the second review focused on the exposure assessment, the third review focused on outcome measurements and results, and the fourth review assessed the risk of bias.

Statistical methods were categorized into linear versus nonlinear methods. Researchers also categorized the cognitive outcomes. For example, liking a product in an advertisement and liking a product in an advertisement were both reported as liking. Cognitive outcomes that contained both negative and positive valence responses were reported as one cognitive outcome (e.g., expectancies).

For each study, we assessed the risk of common biases in observational studies: confounding, selection, performance, detection, and reporting bias (Hernán et al., 2004; Higgins & Green, 2009; Rothman et al., 2008; Viswanathan & Berkman, 2012; Viswanathan et al., 2013). We determined the risk of confounding based on how well each study addressed the most likely confounders of the relationship between alcohol advertising exposure and underage cognitions, including media exposure in general, social environmental factors (i.e., parental drinking, peer drinking), participant’s own drinking status, age, sex, and ethnicity (Fisher et al., 2007; Fleming et al., 1982). Risk of detection bias comprised assessments of outcome reliability, validity, and risk of misclassification. Outcome misclassification was evaluated based on the complexity of the cognitive outcome assessment scales, whether outcomes were assessed on multi-item scales, or validated in previous research. If authors did not provide adequate information to make a judgement on risk of relevant biases we reported the risk to be high.

Two coders independently categorized information from the studies. Differences were resolved through discussion. The primary investigator provided a final review of all categorized information. We conducted the following review in accordance with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines (Moher et al., 2009).

Results

Study characteristics

Table 1 provides an overview of the study sample populations and methods. The 22 included studies were conducted in six countries (Canada, Germany, Netherlands, New Zealand, United Kingdom, and United States). Thirteen studies (59.1%) used an observational cross-sectional design, seven (31.8%) were experimental, and two studies (9.1%) used an observational prospective design. Sample sizes ranged from 74 to 3,521 participants. Convenience sampling was the most common population sampling method (14/22, 63.6%). Table 2 provides details about the design and implementation of each study.

Advertising exposure selection and content

Two studies randomly selected advertising exposures from popular adult magazines and major television networks (Slater et al., 1996, 1997). More commonly, researchers selected advertisements they believed youth would likely be exposed to or find appealing. The content of the advertis-
Figure 1. Study inclusion and exclusion process based on PRISMA guidelines (Moher et al., 2009). aNumber of remaining eligible studies after two rounds of screening by the project coordination team. bExcluded duplicates, non-peer-reviewed papers, not about alcohol advertising, and studies not in English. cExcluded studies in which advertising exposure was not in major media (television or magazines), exposure was based on recall only, no cognitive outcome was assessed, population was not below the legal purchase age (varied by country), not original research, or did not use statistical methods (only contained descriptive or qualitative results) (Criteria a–f).
| Study characteristics, 1988–2016 (n = 22) | Frequency | Percentage |
|------------------------------------------|-----------|------------|
| **Publication date**                     |           |            |
| 1988–2000                               | 11        | 50.0%      |
| 2001–2016                               | 11        | 50.0%      |
| **Region**                               |           |            |
| North America (Canada, United States)    | 17        | 77.3%      |
| Europe (Germany, Netherlands, United Kingdom) | 4      | 18.2%      |
| Other (New Zealand)                      | 1         | 4.5%       |
| **Design**                               |           |            |
| Experimental                            | 7         | 31.8%      |
| Observational cross-sectional            | 13        | 59.1%      |
| Observational prospective               | 2         | 9.1%       |
| **Setting**                              |           |            |
| Ecological                               | 1         | 4.5%       |
| Home                                     | 4         | 18.2%      |
| School                                   | 15        | 68.2%      |
| Science center                           | 2         | 9.1%       |
| **Sample size**                          |           |            |
| 1–500                                    | 14        | 63.6%      |
| >500                                     | 8         | 36.4%      |
| **Sampling strategy**                    |           |            |
| Random                                   | 4         | 17.4%      |
| Nonrandom                                | 16        | 73.9%      |
| Not reported                             | 2         | 8.7%       |
| **Response rate**                        |           |            |
| 54%–80%                                 | 5         | 22.7%      |
| 81%–96%                                 | 4         | 18.2%      |
| Not reported                             | 13        | 59.1%      |
| **Theory**                               |           |            |
| Gender theory                            | 1         | 4.5%       |
| Information-processing models            | 3         | 13.6%      |
| Priming/modeling                         | 17        | 77.3%      |
| Persuasion theory                        | 1         | 4.5%       |
| **Exposure type**                        |           |            |
| Photo                                    | 4         | 18.2%      |
| Photo with brand or product information removed | 6      | 27.3%      |
| Photo and video                          | 1         | 4.5%       |
| Video                                    | 11        | 50.0%      |
| **Data collection method**               |           |            |
| Ecological momentary assessment          | 1         | 4.5%       |
| Interview                                | 1         | 4.5%       |
| Interview and self-report questionnaire   | 5         | 22.7%      |
| Self-report computer assisted survey     | 2         | 9.1%       |
| Self-report questionnaire                 | 12        | 54.5%      |
| Self-report questionnaire and focus group | 1          | 4.5% |
| **Cognitive outcome**                    |           |            |
| Assumed audience                         | 2         | 9.1%       |
| Desirability                             | 3         | 13.6%      |
| Effectiveness                            | 3         | 13.6%      |
| Expectancies                             | 9         | 40.9%      |
| Familiarity                              | 6         | 27.3%      |
| Identification                           | 2         | 9.1%       |
| Intention to use                         | 5         | 22.7%      |
| Liking                                   | 13        | 59.1%      |
| Priming                                  | 3         | 13.6%      |
| Skepticism                               | 3         | 13.6%      |
| Social norms                             | 1         | 4.5%       |
| **Statistical method**                   |           |            |
| Linear                                   | 17        | 77.3%      |
| Structural equation modeling              | 5         | 22.7%      |
| **Confounding variables**                |           |            |
| Age or grade                             | 18        | 81.8%      |
| Alcohol use (lifetime use, intention to use, etc.) | 12 | 54.5% |
| Ethnicity                                | 10        | 45.5%      |
| Media usage (average television hours, magazine reading, etc.) | 7 | 31.8% |
| Personal characteristics (school performance, etc.) | 7 | 31.8% |
| Sex or gender                            | 21        | 95.5%      |
| Social environment (parental or peer drinking, etc.) | 8 | 36.4% |
| Socioeconomic variables (socioeconomic status, etc.) | 8 | 36.4% |
| Variables related to advertisement style/appeal/recall | 6 | 27.3% |
Table 2. Study-specific research methods, 1988–2016 (n = 22)

| Author          | Date    | Country       | Design                      | Sample size | Response rate | Setting     | Female | Age/grade (M, SD)* | Data collection method       | Statistical method | Cognitive outcome                          |
|-----------------|---------|---------------|-----------------------------|-------------|---------------|-------------|--------|-------------------|-----------------------------------|-------------------|---------------------------------------------|
| Aitken et al.   | 1988    | United Kingdom| Observational cross-sectional| 433         | Not reported  | Home        | 49%    | 10–17 years       | Interview and self-report questionnaire | Linear            | Familiarity, liking                      |
| Andsager et al. | 2002    | United States | Observational cross-sectional| 578         | 64%           | School      | 54%    | 9th and 12th grade | Self-report questionnaire          | Linear            | Priming                                  |
| Austin et al.   | 2006    | United States | Observational cross-sectional| 652         | 83%           | Home        | 47%    | 9–17 years (13, 2) | Self-report computer assisted survey | Structural equation modeling | Desirability, expectancies, identification, liking, skepticism |
| Chen et al.     | 2005    | United States | Observational cross-sectional| 253         | 58%           | School      | 53%    | 10–17 years (13)  | Self-report questionnaire          | Structural equation modeling | Effectiveness, liking                   |
| Collins et al.  | 2005    | United States | Observational cross-sectional| 3,521       | 90%           | School      | 50%    | 4th and 9th grade  | Self-report questionnaire          | Linear            | Familiarity, liking, skepticism            |
| Covell          | 1992    | Canada        | Observational cross-sectional| 169         | Not reported  | Science center | 50%    | 8–16 years        | Interview and self-report questionnaire | Linear            | Liking                                    |
| Covell et al.   | 1994    | Canada        | Observational cross-sectional| 75          | Not reported  | Science center | 55%    | 12–16 years (14)  | Interview and self-report questionnaire | Linear            | Effectiveness, liking                   |
| Dunn & Yniguez  | 1999    | United States | Experimental                | 551         | 96%           | School      | 49%    | 4th and 5th grade  | Self-report questionnaire          | Linear            | Expectancies, priming                   |
| Grube & Wallack | 1994    | United States | Observational cross-sectional| 468         | 78%           | Home        | 51%    | 10–14 years (12)  | Interview and self-report questionnaire | Structural equation modeling | Expectancies, familiarity, intention to use |
| Kelly & Edwards | 1998    | United States | Observational cross-sectional| 1,058       | Not reported  | School      | 48%    | 7th, 9th, and 11th grade | Self-report questionnaire          | Linear            | Effectiveness, liking                  |
| Kelly et al.    | 2002    | United States | Experimental                | 384         | Not reported  | School      | Not reported | 12–16 years       | Self-report questionnaire          | Structural equation modeling | Desirability, liking                  |
| Lipsitz et al.  | 1993    | United States | Experimental                | 74          | Not reported  | School      | 53%    | (14 years)        | Self-report questionnaire          | Linear            | Expectancies                             |
| Martino et al.  | 2016    | United States | Observational cohort        | 606         | Not reported  | Ecological  | 46%    | 11–14 years       | Ecological momentary assessment    | Linear            | Expectancies, social norms              |
| Morgenstern et al.| 2011   | Germany       | Observational prospective   | 2,130       | 81%           | School      | 53%    | 10–17 years (12)  | Self-report questionnaire          | Linear            | Expectancies, familiarity               |

Table continued
| Author       | Date  | Country          | Design                        | Sample size | Response rate | Setting   | Female | Age/grade (M, SD)* | Data collection method | Statistical method | Cognitive outcome       |
|--------------|-------|------------------|-------------------------------|-------------|---------------|-----------|--------|-------------------|------------------------|----------------------|------------------------|
| Nash et al.  | 2009  | United Kingdom   | Observational cross-sectional | 179         | Not reported  | School    | 57%    | 7–11 years (9, 0.82) | Self-report computer assisted survey | Linear               | Assumed audience, intention to use, liking |
| Pinkleton et al. | 2001 | United States    | Observational cross-sectional | 578         | 64%           | School    | 54%    | 9th and 12th grade | Self-report questionnaire | Linear               | Desirability, expectancies, identification |
| Slater et al. | 1996 | United States    | Experimental                  | 401         | 20% mail contacts, overall not reported | School    | 40%    | Junior high (13.3 years); Senior high (16.6 years) | Interview and self-report questionnaire | Linear               | Assumed audience, liking |
| Slater et al. | 1997 | United States    | Experimental                  | 244         | Not reported  | School    | 65%    | (15 years)         | Self-report questionnaire and focus group | Linear               | Intention to use, liking, skepticism |
| Unger et al.  | 1995  | United States    | Observational cross-sectional | 386         | Not reported  | School    | 54%    | 13–16 years (14, 0.53) | Self-report questionnaire | Linear               | Familiarity, liking |
| van Hoof et al. | 2009 | Netherlands      | Experimental                  | 248         | Not reported  | School    | 60%    | 12–18 years (15)   | Self-report questionnaire | Linear               | Expectancies, intention to use, priming |
| Wyllie et al. | 1998  | New Zealand      | Observational cross-sectional | 500         | 54%           | Home      | Not reported  | 10–17 years         | Interview             | Structural equation modeling | Familiarity, intention to use, liking |
| Zwarun et al. | 2006 | United States    | Experimental                  | 215         | Not reported  | School    | 81%    | 9th, 10th, 11th, and 12th grade | Self-report questionnaire | Linear               | Expectancies            |

*Not all studies reported exact ages. Mean age and standard deviation in years are reported in parenthesis where available.
ing exposures is categorized by study in Table 3. Across all studies, the most common advertisement content was humor, music, sports, diversity, and animals. Fifteen studies (68.2%) used control advertisements including public service announcements, tobacco advertisements, beer advertisements with no images, or other product advertisements. Budweiser beer advertisements were the most common exposures, used by 40.9% (9/22) of the studies.

Confounding variables are summarized in Table 1 and described by study in the bias analysis table (Supplemental Table A). (Supplemental material appears as an online-only addendum to the article on the journal’s website.) The most common confounding variables were sex (21/22, 95.5%), age or grade (18/22, 81.8%), and alcohol use measures (12/22, 54.5%).

Theoretical frameworks

Priming and modeling theories (17/22, 77.3%) were the most common frameworks for understanding the association between underage exposure to alcohol advertising and cognitive outcomes (Table 1). Three studies (3/22, 13.6%) used information-processing models that build on cognitive theories, such as the priming and modeling, but use frameworks that include both logic and affect-based dimensions of decision-making (Austin et al., 2006; Grube & Wallack, 1994; Pinkleton et al., 2001). Slater et al. (1997) used persuasion theory based on evidence that the thoughts and feelings of the viewers while processing advertisement messages mediate the effects of the message, which was similar to the information-processing models. One study framed their analyses using gender theory that emphasized the role of gendered norms, which influence the types of advertising messages that are appealing to males or females (Andsager et al., 2002).

Cognitive outcomes

Table 4 provides a complete list of the associations between advertising exposure and cognitive outcomes for each of the 22 studies. The studies used different scales and study designs. Therefore, we cannot compare effect estimates across studies. We briefly summarize findings for key cognitive outcomes below.

Familiarity. Six studies removed the references of the brand name or product description and asked youth to identify the advertised brand. Older youth ages 14–17 and youth who drank alcohol were able to name more advertised brands compared with youth ages 10–13 and nondrinkers (Aitken et al., 1988; Wyllie et al., 1998). Comparing ninth graders with fourth graders, older participants recognized Budweiser advertisements more than fourth graders, and ninth graders could identify the Budweiser advertisement almost as well as the Pepsi advertisement (Collins et al., 2005). More males than females correctly identified brands and recognized slogans (Aitken et al., 1988; Grube & Wallack, 1994; Unger et al., 1995). Asian and White youth were more familiar with Absolut products, whereas Black youth were more likely to correctly identify Hennessey advertisements (Unger et al., 1995). Familiarity with the advertisements was related to alcohol use initiation and binge drinking at follow-up after baseline attitudes toward alcohol were controlled for (Morgenstern et al., 2011).

Liking. Liking was assessed in 59.1% (13/22) of the studies. Three categories of liking alcohol advertisements were used in the studies: liking the brand/product advertised, liking the advertisement as a whole, or liking themes or specific elements of the advertisement.

Liking the brand or product. One study found that males liked beer advertisements more than females (Unger et al., 1995). Wyllie et al. (1998) found that liking beer advertisements did not vary by age or sex, and Austin et al. (2006) found similar associations for liking beer brands between sexes. Identification with portrayals, positive alcohol expectations, and watching television sports were associated with liking beer brands (Austin et al., 2006). Having negative expectations of alcohol use was negatively associated with liking beer brands (Austin et al., 2006).

Liking the advertisement. Youth reported liking alcohol advertisements more than other types of product advertisements (Covell et al., 1994; Nash et al., 2009), with variations by age (Collins et al., 2005). Liking scores were higher among youth who reported prior drinking or current drinking compared with youth who did not have experience with alcohol use (Aitken et al., 1988; Austin et al., 2006; Unger et al., 1995; Wyllie et al., 1998). One study found an association between believing that other children were the audience for the advertisement and liking the advertisement (Nash et al., 2009), whereas another study found no association between perceiving people in the advertisements as underage and liking the advertisement (Slater et al., 1996).

Liking content. Ratings of alcohol advertisement themes and content were relatively similar across studies. Youth appreciated the use of humor, and liked advertisements with animals, cartoons, and music (Aitken et al., 1988; Chen et al., 2005; Nash et al., 2009). Males liked advertisements with fantasy and modernistic imagery more than females, whereas advertisements with more female imagery had higher liking scores among females (Aitken et al., 1988). Males responded more positively to beer advertisements with sports content than females (Slater et al., 1997).

Four studies categorized types of advertisement content by distinguishing between product quality advertisements and image or lifestyle advertisements. Product quality advertisements focused on characteristics of the product or
| Author          | Date  | Type, source          | Control type | Exposure content                                                                 | Brand                                                                 |
|-----------------|-------|-----------------------|--------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------|
| Aitken et al.   | 1988  | Photo,* TV            | N.A.         | Action, bright colors, femininity, humor, modernistic, music, surrealistic         | Castlemaine XXXX, Guinness, Holstein Pils, Lamot, Malibu, McEwan's, Tennent's, Taunton Dry Blackthorn, Woodpecker |
| Andsager et al. | 2002  | Video, TV             | Public service announcement | Celebrities, diversity, fantasy, humor, music, party, sports, story               | Budweiser, Miller Genuine Draft, Miller Light, St. Ides               |
| Austin et al.   | 2006  | Video, TV             | N.A.         | Not reported                                                                      | Anheuser Busch, Budweiser, Coors Light, Miller Light, Samuel Adams   |
| Chen et al.     | 2005  | Video, TV             | N.A.         | Animals, celebrities, diversity, humor, image, intimacy, music, quality, sports   | Anheuser Busch, Beck’s, Bud Light, Budweiser, Busch, Coors, Foster’s, Coors Light, Guinness, Heineken, Michelob Light, Miller High Life, Miller Light |
| Collins et al.  | 2005  | Photo,* TV            | Soda         | Animals, femininity, masculinity, sports, technology, celebrity                   | Budweiser, Coors Light, Heineken, Miller                             |
| Covell et al.   | 1992  | Photo, magazine       | N.A.         | Image, quality                                                                     | Not reported                                                          |
| Covell et al.   | 1994  | Photo, magazine       | Tobacco      | Image, quality                                                                     | Not reported                                                          |
| Dunn & Yniguez | 1999  | Video, TV             | Soda         | Intimacy, party, youth                                                            | Not reported                                                          |
| Grube & Wallack | 1994  | Photo,* TV            | N.A.         | Not reported                                                                      | Budweiser, Budweiser Light, Coors, Coors Light, Michelob Dry         |
| Kelly & Edwards| 1998  | Photo, magazine       | N.A.         | Image, quality                                                                     | Grolsch, Lindemans, Scoresby, others not reported                    |
| Kelly et al.    | 2002  | Photo, magazine       | Text only beer advertisements | Image, people                                                                     | Budweiser, Dos Equis, Miller, Rolling Rock                           |
| Lipsitz et al.  | 1993  | Video, TV             | Soda, other fillers and public service advertisements | Athleticism, attractiveness, camaraderie, fun, intimacy, love, relaxation, youth | Budweiser, others not reported                                     |
| Martino et al.  | 2016  | Photo/video, TV, magazine, other | Random prompts during non-exposure periods | Not reported                                                                      | Not reported                                                          |
| Morgenstern et al. | 2011 | Photo,* TV            | Other products | Animals, beach, landscape, masculinity, party                                      | Beck’s, Cab, Flensburger, Gorbatschow, Holsten, Jaegermeister, Krombacher, Jever, Veltins V+ |
| Nash et al.     | 2009  | Video, TV             | Other products | Achievement, animals, cartoons, cognitive impairment, cognitive improvement, humor, image, music, quality, relaxation, social | Archer’s, Bacardi Breezer, Bell’s, Boddington’s, Budweiser, Guinness, Smirnoff Black Ice, John Smith’s |
| Pinkleton et al.| 2001  | Video, TV             | Public service announcement | Celebrities, diversity, humor, music, storyline                                    | Not reported                                                          |
| Slater et al.   | 1996  | Video, TV             | Nonbeer      | Sports, people, other content not reported                                        | Not reported                                                          |
| Slater et al.   | 1997  | Video, TV             | Other products | Sports, other content not reported                                                | Not reported                                                          |
| Unger et al.    | 1995  | Photo,* magazine, and TV | Tobacco and other products | Diversity, elegance, fashion, femininity, fun, masculinity, romance               | Absolut, Bacardi, Budweiser, Hennessey, Jose Cuervo, Southern Comfort |
| van Hoof et al. | 2009  | Video, TV             | Lemonade     | Youth                                                                              | Not reported                                                          |
| Wyllie et al.   | 1998  | Photo,* TV            | N.A.         | Sports, other content not reported                                                | DB Bitter, Lion Red, Steinlager Blue                                  |
| Zwarun et al.   | 2006  | Video, TV             | Other products | Excitement, friendship, risky activities                                           | Bud Light, Miller, Molson Ice                                        |

**Notes:** N.A. = not applicable. *Exposure manipulation. bContent of these types of alcohol advertisements focused on lifestyles of the people who drank the alcohol product. It did not focus on the quality or attributes of the product itself, with the exception for Kelly et al. (2002), in which image refers to advertisements with graphics as opposed to text only. cContent of these types of alcohol advertisements focused on characteristics of the product/brand, such as distilling processes or information on ingredients.
brand, for example the superior taste of the brand. Image advertisements relied on messages about drinkers’ lifestyles with appealing imagery describing the social benefits of drinking. In effect, image advertisements relayed information about the value of drinking rather than the value of the product itself (Snyder & DeBono, 1985). Four studies assessed liking scores between image and product quality advertisements and consistently found higher liking ratings of image advertisements among youth compared with product quality-focused messages (Covell, 1992; Covell et al., 1994; Kelly & Edwards, 1998; Nash et al., 2009). One study compared youth perceptions of advertisements with images to copies of the advertisements without images, or “tombstone” advertisements that contained text only (Kelly et al., 2002). They found that the versions of the advertisements with images had a direct positive effect on attitudes toward the advertisement. In addition, the effect of image advertisements on liking the product category (i.e., beer, spirits) was mediated by attitudes toward the advertisement and the brand (Kelly et al., 2002).

**Skepticism.** Measures of skepticism assessed how critical youth were of the claims made in alcohol advertisements. Measures of skepticism included questions such as “alcohol ads make drinking seem better than it really is” or “beer ads try to trick you” (Austin et al., 2006; Collins et al., 2005). Youth who watched more television were less skeptical of alcohol advertising messages (Austin et al., 2006). Adolescents were twice as likely to counterargue messages in beer advertisements compared with nonbeer advertisements (Slater et al., 1997). This effect was larger among females than among males. Slater et al. also found that males were less skeptical of alcohol advertisements that occurred on sports programming compared with females. Collins et al. (2005) found that younger populations (fourth graders) were less skeptical than older populations (ninth graders).

**Desirability.** Measures of desirability assessed whether youth believed that people in alcohol advertisements appeared to be having fun or were attractive, popular, happy, or strong. Youth who reported more parental guidance found alcohol advertisement portrayals less desirable; this effect was stronger among males than females (Austin et al., 2006). Age, advertisement content, and skepticism were positively related to desirability (Austin et al., 2006; Pinkleton et al., 2001).

Kelly et al. (2002) measured the desirability of alcohol use (i.e., alcohol is cool, in-style) and found that advertisements with images had a small positive effect on alcohol desirability.

**Identification.** Two studies asked whether youth identified with the images in the advertisements (i.e., wished to be like the people in the alcohol advertisements). Youth who reported watching more primetime television and agreed that television was a realistic source of information identified more with the alcohol advertisements (Austin et al., 2006). Desirability, or perceived attractiveness of the advertisement, was associated with identification (Austin et al., 2006; Pinkleton et al., 2001).

**Effectiveness.** Three studies (3/22, 13.6%) assessed perceptions of advertising effectiveness (i.e., rate how effective advertisements were at persuading them to use alcohol, or which type of advertisements would be more likely to persuade someone to buy the product). Liking scores were predictive of advertisement effectiveness (Chen et al., 2005). Males who drank alcohol, as well as younger adolescents in general, rated advertisements as more effective in making them want to purchase the product (Chen et al., 2005). Image advertisements were more effective than quality-oriented advertisements (Covell et al., 1994; Kelly & Edwards, 1998).

**Expectancies.** Expectancies about alcohol use were measured in 40.9% of the studies (9/22), with most studies assessing both positive and negative expectancies. Positive expectancy measures contained items such as “drinking alcohol makes me feel more confident” or “drinking is a good way to relax” (Grube & Wallack, 1994; Zwarun et al., 2006). Negative expectancy measures included items such as “drinking three or four alcoholic beverages would get you into trouble with the police . . . or do something you regret later” (Austin et al., 2006; Lipsitz et al., 1993).

In observational cross-sectional studies, youth had more positive expectancies about alcohol use if they watched more television, identified with the advertisement portrayals, or had parents who were more approving of drinking alcohol (Austin et al., 2006; Grube & Wallack, 1994; Pinkleton et al., 2001). Lipsitz et al. (1993) found no effect of advertising exposure on expectancies. Three experimental studies compared youth who were not exposed to alcohol advertising with those who were exposed. Exposed youth were more likely to associate positive and arousing effects with alcohol cues and less likely to associate undesirable or negative effects compared with unexposed youth (Dunn & Yniguez, 1999; van Hoof et al., 2009; Zwarun et al., 2006). Results from an ecological momentary assessment study found that positive alcohol expectancies were elevated immediately after exposure to alcohol advertisements compared with other random times throughout the day (Martino et al., 2016). In a prospective observational study comparing exposure to alcohol advertisements with exposure to nonalcohol advertisements, alcohol advertising exposure had a direct effect on alcohol use initiation and binge drinking at follow-up mediated through positive expectancies (Morgenstern et al., 2011).

**Intention to use alcohol.** Five studies (22.7%) assessed future intentions to use the advertised alcohol products. In two studies, positive responses to alcohol advertisements (such as liking) were associated with an increase in expectations of future alcohol consumption (Slater et al., 1997; Wyllie et al., 1998). Nash et al. (2009) found that among youth exposed to alcohol advertising, third graders were more likely to want
Aitken et al. (1988) Older age youth (age 16–17) and drinkers were able to correctly identify more advertisements compared with their younger and non-drinking peers. Males were more likely to recognize and identify alcohol brands compared with females.

Collins et al. (2005) More ninth than fourth graders recognized the Budweiser beer brand. Ninth graders knew the Budweiser advertisements almost as well as the Pepsi advertisements. Fourth graders were less familiar with the Budweiser advertisement than the Pepsi advertisement, yet 1 in 3 correctly identified the Budweiser brand. Identical percentages from each grade matched at least one brand slogan to the advertised beer.

Grube & Wallack (1994) Correctly identifying brand names in advertisements was indirectly related to intentions to drink as an adult via positive beliefs. Watching more television and believing their parents drank more frequently were related to having previously seen the advertisement and correctly identifying the brand. Males recognized more slogans and brands than females.

Morgenstern et al. (2011) Cued recall of alcohol advertisements predicted behavior at follow-up after controlling for baseline attitudes toward alcohol.

Unger et al. (1995) Sex was correlated with brand name recognition for Budweiser advertisements and product type identification for Absolut. Males identified the alcohol brand name and product in the advertisements more than females. Asian Americans and European Americans recognized advertisements more than African Americans and Latinos except for Hennessey, which was recognized more often by African Americans compared with other ethnic groups.

Wyllie et al. (1998) Older age youth (ages 14–17) correctly identified more alcohol brand names in advertisements compared with youth ages 10–13.

Kelly & Edwards (1998) Participants found image advertisements more appealing than quality advertisements. Strongest preference for image advertisements was among seventh graders. Males liked image advertisements more than females. Adolescents thought their friends would like image advertisements, find them more appealing and persuasive compared with quality advertisements.

Kelly et al. (2002) Image-oriented advertisements had a positive direct effect on attitudes toward the advertisement. Effect of image advertisements for product category (i.e., beer) was mediated by attitudes toward the advertisement and the brand.

Nash et al. (2009) Children of all grades liked alcohol advertisements more than nonalcohol advertisements. Popular advertisements contained content with cartoons, simple visual humor and/or animals. Least popular advertisements focused on product quality. Males preferred alcohol advertisements more than females.

Slater et al. (1996) No associations found between youth who reported that people in beer advertisement were underage and liking or disliking the advertisement.

Slater et al. (1997) Males had more positive comments about beer advertisements with sports content than did females. Significant differences in response polarity between males and females were not observed for beer advertisements without sports content. Females responded more negatively to advertisements during sports programming than did males.

Unger et al. (1995) Liking of advertisements increased with level of alcohol use. Males liked Budweiser advertisements more than females. Ethnicity was not a significant predictor of liking the advertisements.

Wyllie et al. (1998) Liking beer advertisements was related to frequency of current drinking. Liking of beer advertisements did not vary by sex or age.

Table continued
TABLE 4.  Continued

| Cognitive outcome | Cognitive results |
|-------------------|------------------|
| **Skepticism**    |                  |
| Austin et al. (2006) | Youth who watched more hours of television were less skeptical towards alcohol advertisements. Parental guidance was associated with higher levels of skepticism (stronger association among older youth ages 12–17 compared with youth ages 9–11). |
| Collins et al. (2005) | Fourth graders were less skeptical of messages in beer advertisements compared with ninth graders. |
| Slater et al. (1997) | Adolescents were twice as likely to counter argue messages in beer advertisements compared with nonbeer advertisements. Female adolescents counter argued alcohol advertisements more frequently than nonalcohol advertisements compared with males. Males were less skeptical of advertisements occurring in sports programming compared with females. No significant main effects of Latino ethnicity on response polarity or counter arguing of advertisements. |
| **Desirability**  |                  |
| Austin et al. (2006) | Parental guidance reduced desirability of alcohol advertisements. By contrast, participant’s skepticism of advertisements increased desirability of advertisement portrayals (i.e., people in advertisements are good looking, strong, having fun). Reporting more parental guidance was negatively associated with desirability, this association was stronger among males. Males who perceived less parental guidance found advertisements more desirable. |
| Pinkleton et al. (2001) | Favorable affect toward content of the advertisements positively predicted desirability. |
| Kelly et al. (2002) | Compared with advertisements without images, advertisements with images had a small positive effect on the desirability of alcohol (i.e., cool, in-style). |
| **Identification** |                  |
| Austin et al. (2006) | Youth who watched more primetime television and believed portrayals in alcohol advertisements were desirable identified more with the advertisements. |
| Pinkleton et al. (2001) | Favoring the production quality of alcohol advertisements was positively associated with identification with the advertisement. Agreement that television is a realistic source of information and higher desirability scores (e.g., people in beers advertisement are attractive) were positively associated with identification. |
| **Effectiveness** |                  |
| Chen et al. (2005) | Drinking experience, male sex, and younger aged participants reported higher advertisement effectiveness (i.e., advertisements reportedly made them want to buy the product). |
| Covell et al. (1994) | Image-oriented advertisements were more persuasive than quality-oriented advertisements. The effect of image-oriented advertisements was stronger among females compared with males. Self-monitoring did not modify ratings of advertisement effectiveness (i.e., “how successful they felt the advertisements would be in persuading people like themselves”). |
| Kelly & Edwards (1998) | Image advertisements were considered more persuasive than quality advertisements. Both males and females with intentions to drink had a stronger preference for image advertisements (except 11th grade females). |
| **Expectancies**  |                  |
| Austin et al. (2006) | Watching more primetime television was associated with positive alcohol expectancies. Watching more television was associated with negative alcohol expectancies. Parental guidance had a direct negative association with positive alcohol expectancies. Skepticism operated more strongly for females than males in setting negative expectancies. There were no large differences in associations between males and females with regard to positive expectancies of alcohol use. |
| Dunn & Yiniguez (1999) | Participants exposed to beer advertisements compared with soda advertisements were more likely to associate positive and arousing effects with alcohol cues and less likely to associate undesirable effects with drinking alcohol. No differences between sexes were found. |
| Grube & Wallack (1994) | Participants with higher perceptions of parental approval of drinking reported more positive drinking expectancies. Those with higher perceptions of peer approval of drinking reported fewer negative drinking expectancies. |
| Lipsitz et al. (1993) | No significant video exposure effects. Eighth graders had more positive expectancies compared with fifth graders. Females had more negative expectancies for alcohol than males but this was not correlated with the advertisement exposure. |
| Martino et al. (2016) | Positive alcohol expectancies tended to be higher at moments of exposure (confidence interval signaled trend present although authors did not conclude this as a finding of their study). Older age and intention to drink in the next 6 months were associated with more positive and less negative expectancies. Being a female was associated with more positive and more negative alcohol expectancies compared with being male. |
| Morgenstern et al. (2011) | Exposure to alcohol advertisements had a direct effect on alcohol use initiation and binge drinking at follow-up. Alcohol advertisement exposure had an indirect effect on alcohol use mediated through increased positive alcohol-related attitudes. |
| Pinkleton et al. (2001) | Identification with portrayals and favorable affect toward alcohol advertisement content were the strongest predictors of expectancies. Expectancies had the largest effect on alcohol use. |
| van Hoof et al (2009) | Exposed group had more positive perceived consequences than students who watched nonalcoholic advertisements. |
| Zwarun et al. (2006) | Participants exposed to beer advertisements had more positive social expectancies about alcohol than unexposed group. Exposed males had more positive expectancies than unexposed males. Advertisements affected males’ expectancies more than females’. |
to try the alcohol products compared with fifth graders. This difference was not observed in the unexposed control groups. Slater et al. (1997) found that higher levels of counterarguing of alcohol advertisement messages was associated with lower levels of future intentions to use, and did not find evidence of differences by sex, but positive responses to beer advertisements and intention to use were stronger among White youth compared with Latino youth. Van Hoof et al. (2009) did not find an effect between exposure to alcohol advertisements and future intentions to consume alcohol. One study found an indirect relationship between awareness of alcohol advertisements and intention to use alcohol as an adult mediated by positive beliefs about alcohol use (Grube & Wallack, 1994).

### Priming
Priming was assessed using open-ended prompts such as “tell us what you thought about [the alcohol ads],” “How do people feel when they drink alcohol? Write down as many single words/phrases you can” (Andsager et al., 2002; Dunn & Yniguez, 1999). Van Hoof et al. (2009) used word completion tasks in which youth were given one or two letters and asked to complete the word. Answers differed among females and males. In the word completion tasks, females referred more to alcohol than males; however, there were no observed effects of exposure to alcohol advertisements versus nonalcoholic advertisements (van Hoof et al., 2009). In an experimental study among fourth and fifth graders, the most common word first associated with how people feel when they drink alcohol was “good” for those who were

### Table 4. Continued

| Cognitive outcome | Cognitive results |
|-------------------|-------------------|
| **Intention to use** | |
| Grube & Wallack (1994) | Awareness of alcohol advertising (i.e., brand recall or recalled having seen the advertisement before) was indirectly related to intentions to use alcohol as an adult through positive beliefs about alcohol use (i.e., alcohol is a reward for hard work, alcohol is sociable). |
| Nash et al. (2009) | Youth in Grade 3 were more likely to want to try alcohol products in the advertisements compared with youth in Grade 5 (no difference was found between grades for nonalcoholic advertisement exposure). Across all grades, positive perceptions of advertisements increased the appeal of trying the product for both alcoholic and nonalcoholic products. |
| Slater et al. (1997) | Higher levels of counterarguing were associated with lower levels of future intentions to use. Positive responses to beer advertisements were associated with higher levels of future intentions to use alcohol. No differences by sex were found. Responses to beer advertisements and future intentions to use was weaker for Latino than for White participants. |
| van Hoof et al. (2009) | Exposure to alcohol advertisements did not affect participant’s behavioral intentions compared with those who watched nonalcoholic advertisements. |
| Wyllie et al. (1998) | Positive responses to beer advertisements contributed to an increase in expected frequency of future drinking. |
| **Priming** | |
| Andsager et al. (2002) | Males rated the individual-based messages in alcohol advertisements as more memorable, trustworthy, and persuasive than females. |
| Dunn & Yniguez (1999) | Fourth graders who viewed soda advertisements were more likely to respond that people feel “bad” when they drink alcohol than those who viewed alcohol advertisements. Most common first word associate among fourth graders who viewed beer commercials was “good.” “Good” was reported twice as much by fifth graders in exposed group compared with fifth graders in the control group who viewed soda advertisements. |
| van Hoof et al. (2009) | No differences between students who watched alcohol advertisements and students who watched nonalcoholic advertisements were found on the word completion task. Females referred more to alcohol than male participants on the word completion task. |
| **Assumed audience** | |
| Nash et al. (2009) | Participants selected adults and teenagers as the assumed audience. Liking an advertisement was correlated with believing that other children were the audience for the advertisement. |
| Slater et al. (1996) | Among junior high–age youth, the belief that people in beer advertisements were below the legal drinking age was related to drinking history. Those who had been drunk before were more likely to report people in advertisements were underage. High school–age youth who reported having been drunk before were less likely to report people in beer advertisements were underage (marginally significant). Overall, no association found between youth who reported having been drunk and belief that people in beer advertisements were underage. |
| **Social norms** | |
| Martino et al. (2016) | Perceptions of a typical person one’s age who drinks were more positive at moments of exposure to advertising compared with randomly sampled moments of nonexposure. Females, older students, and students who intended to use alcohol in the next 6 months had more favorable perceptions of a typical person their age who drinks alcohol; this effect was strongest among non-Hispanic white students. Association between exposure and normative beliefs about prevalence of alcohol use among peers was only significant among White students. |

*Content of these types of alcohol advertisements focused on lifestyles of the people who drank the alcohol product. It did not focus on the quality or attributes of the product itself, with the exception of Kelly et al. (2002), in which image refers to advertisements with graphics as opposed to text only. *Content of these types of alcohol advertisements focused on characteristics of the product/brand, such as distilling processes or information on ingredients.*
Youth cognitive responses to alcohol advertising were complex, with many factors modifying the association. First, differences by age, experience with alcohol use, and alcohol advertisement content appeared to play an important role in defining youth cognitive responses to alcohol advertisements. For instance, younger populations were less skeptical of advertising claims compared with older adolescents. Youth who reported prior alcohol use liked alcohol advertisements more than their peers with less or no alcohol use history. Youth, overall, preferred image advertisements that portrayed the appeal of drinking lifestyles rather than quality advertisements that featured product attributes such as ingredients or taste. Second, it appears that parental guidance can modify adolescents’ cognitive responses to advertising, but this may vary by sex. Last, evidence suggests that alcohol advertisements may influence drinking intentions and behaviors through mediated processes involving expectations about alcohol use. But this conclusion should be tempered by evidence suggesting that alcohol advertising is not a uniform exposure among youth, but rather, specific advertisements are appealing depending on characteristics of the observer, content of advertisement, and context in which an advertisement appears.

Although an extensive amount of research about youth cognitive responses to alcohol advertising has been conducted, much of it has been based on study designs at moderate to high risk of multiple biases. This field of research has lacked a consistent theoretical framework to guide research.
designs, used a range of measures, many of which have not been validated, and often used convenience samples subject to selection biases.

**Discussion**

In this systematic review, we have summarized evidence from studies that assessed cognitive responses to alcohol advertisements among populations that are not legally allowed to purchase alcohol. Despite the limitations of prior research, the strongest evidence to date suggests that an information-processing model is the most useful framework to understand how alcohol advertising can affect underage drinking behavior because it considers the relationship between alcohol advertising content and perceptions of the viewers. For example, the Message Interpretation Process model specifies that the viewer must engage with the content, find the content desirable and identify with it to set expectations of certain benefits from drinking behaviors (Austin et al., 2006).

Alternatively, priming theory suggests that exposure to a stimulus or event, such as alcohol advertisements, can alter future behaviors by creating positive associations in memory which can affect an individual’s subsequent judgement or behavior (Roskos-Ewoldsen & Roskos-Ewoldsen, 2009). If priming is the dominant mechanism by which alcohol advertising is associated with alcohol consumption, then advertisers will design their advertisements to prime an association between the alcohol brand and some desirable affective state. For example, drinking certain brands of alcohol may be associated with being attractive, rebellious, or healthy. Research has shown that repeated exposure to certain images may prime associations without cognitive engagement (Roskos-Ewoldsen & Roskos-Ewoldsen, 2009). To that point, some of the reviewed studies looked at both explicitly reported cognitions, as well as rapid word association tests (Dunn & Yniguez, 1999; Slater et al., 1997; van Hoof et al., 2009).

Both priming and the Message Interpretation Process model define alcohol expectancies as a key mediator of the association between advertising exposure and drinking behavior, and both theories describe nonlinear processes. These theories represent changes in cognitive states, moving the adolescent from a naive state to a primed state in which certain positive expectations about alcohol use have been set.

This threshold effect is well known among advertising researchers, having been first reported in the 1960s by two researchers working with Anheuser-Busch (Ackoff & Emshoff, 1975). They described a saturation point above which advertising has a marginal effect. Although their research focused on macro-effects of advertising spending across populations, it is consistent with individual-level priming. The threshold effect was further codified as one of five “empirical generalizations” advertisers consider both highly valid and important: “The advertising response curve is ‘convex’—the greatest marginal response is from the first exposures. As the number of cumulative exposures in a period increases, the marginal effect of the advertising drops” (Taylor et al., 2009, p. 199). This would suggest that any study of the association between advertising exposure and adolescent drinking should be designed to detect a threshold effect, with high levels of advertising exposure producing little to no incremental effect after the positive alcohol expectancies threshold has been reached.

**Implications for future research**

Based on these findings, we would expect advertising effects to be strongest in populations that are primed for the first time with positive images about alcohol use. Once positive expectations have been set, additional exposures will have a marginal effect. This implies that studies need to be conducted in younger populations who have little exposure to prior alcohol use, and take into consideration the nonlinear association between advertising exposure and alcohol expectancies. Further, we know that advertisers are targeting specific demographics following the introduction of specialized brands (e.g., Skinny Girl Beverages for women, Tecate and Presidente beer for Spanish-speaking populations). Thus, the research needs to account for the advertising content and investigate different associations in demographic groups. Also, companies are taking steps to expand their advertising efforts in emerging markets, such as India where the historical prevalence of alcohol consumption has been relatively low (Esser & Jernigan, 2015; World Health Organization, 2004). Global shifts in alcohol advertising may serve as natural experiments for future research on the effects of alcohol advertising. Last, beliefs and attitudes about alcohol use should be treated as a mediator in the association between alcohol advertising exposure and drinking behaviors.

**Strengths and limitations**

These findings should be interpreted with consideration of the following strengths and limitations. First, based on the studies included in this review, causality between alcohol advertising exposure and underage beliefs and attitudes about alcohol use remains largely unanswered, despite evidence from longitudinal studies that assessed changes in behaviors among youth who were exposed to alcohol advertisements. Second, because of the varied nature of the study designs, outcome measures, and measures of association, it was not possible to summarize and compare estimates of association. In addition, despite limiting the selection criteria to studies with persons below the legal purchase age, there is a still a range of ages (e.g., 4th to 12th grade) with considerably different developmental and cognitive capacities. As a result, findings from each study may not be generalizable to all underage populations and should be interpreted in the context...
of the study population. This sample also included a range of countries with variations in advertising regulations and cultural beliefs about alcohol use. These differences between countries may affect how youth interact with advertisements and think about alcohol use. Last, alcohol advertising messages are communicated through increasingly more interactive methods, such as social media, which may have different impacts on underage cognitions.

The strengths of the current study include the systematic search methods from the project coordination team, which provided an exhaustive list of relevant studies. In addition, the geographic diversity of the studies accounted for different advertising environments and youth populations. To our knowledge, this is the first attempt to synthesize evidence of underage cognitive responses to alcohol advertising messages to better understand prevailing theories of how alcohol advertising exposure may change alcohol use behaviors among youth, mediated by changes in attitudes and beliefs about alcohol use.

Conclusions

Because of limitations in study design, the ability to draw causal conclusions is limited. Nonetheless, based on these findings, priming and information-processing models should be foundational elements of research assessing the impacts of alcohol advertising exposure. Measuring alcohol advertising as a uniform exposure on a diverse population should be avoided in future research. Instead, taking into account the content of alcohol advertisements, the target audiences, and measuring effects among younger populations who are not yet primed with alcohol use expectations may provide the most insight into the potential effects of alcohol advertising on youth.

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