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Exposure to Alcohol Advertising and Adolescents' Drinking Beliefs: Role of Message Interpretation

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Abstract

Objective—Recent research revealed momentary associations between exposure to alcohol advertising and positive beliefs about alcohol among adolescents (Martino et al., 2016). We reanalyzed those data to determine whether associations depend on adolescents' appraisal of ads.

Methods—Over a 10-month period in 2013, 589 Los Angeles-area youth ages 11–14 participated in a 14-day ecological momentary assessment, logging all exposures to alcohol advertisements as they occurred and completing brief assessments of their skepticism toward, liking of, and identification with any people in each ad, as well as their alcohol related-beliefs at the moment. Participants also completed measures of their alcohol related-beliefs at random moments of non-exposure throughout each day. Mixed effects regression models compared beliefs about alcohol at moments of exposure to alcohol advertising that was appraised in a particular way (e.g., with liking, without liking) to beliefs at random moments.

Results—When youth encountered ads they appraised positively, their beliefs about alcohol were significantly more positive than when they were queried at random moments. Beliefs in the presence of ads that were not positively appraised were generally similar to beliefs at random moments.

Conclusions—Youth are active participants in the advertising process. How they respond to and process alcohol advertising strongly moderates the association between exposure and alcohol-related beliefs. More effort is needed to identify attributes of alcohol advertisements, and of youth, that determine how youth process alcohol ads. This information can be used to either limit exposure to problematic ads or make youth more resilient to such exposure.

Keywords

alcohol advertising; ecological momentary assessment; message processing; underage drinking

Underage drinking is a major public health problem, contributing to a host of problems during youth and later in life (Ellickson et al., 2003; Grant & Dawson, 1997; Hingson et al.,

2001, 2009; Stueve & O'Donnell, 2005). One contributor to adolescent alcohol use may be alcohol advertising. Adolescents are exposed to alcohol advertising on a regular basis – encountering an average of more than 3 ads every day (Collins et al., 2016). A substantial body of research indicates that youth who see more ads for alcohol on television, online, on billboards, and in stores are more likely to become underage drinkers (Anderson et al., 2009). These studies suggest that alcohol advertising may also hasten initiation of drinking, increase consumption among underage drinkers (Anderson et al., 2009; Collins et al., 2007; Ellickson et al., 2005; Snyder et al., 2006) and contribute to youth problem drinking (Grenard, 2013; Morgenstern et al., 2014; Tanski et al., 2015). Although all of these studies are correlational in design, a causal interpretation of this evidence is bolstered by a number of studies with rigorous longitudinal designs and multiple statistical controls as well as evidence indicating that the brands in ads to which youth are exposed are the same brands of alcohol they drink (Siegel et al., 2015).

Alcohol advertising appears to contribute to underage drinking by shifting adolescents' beliefs about drinking, including their outcome expectancies, normative perceptions and perceptions of the typical drinker (Dal Cin et al., 2009; McClure et al., 2013; Martino et al., 2016; Morgenstern et al., 2011). Pro-alcohol beliefs are theorized to be engaged at each advertising exposure and strengthened with repeated exposure, creating a susceptibility to drinking that may be acted upon when alcohol is available (Bandura, 2001; Gibbons, Pomery, & Gerrard, 2008). This model is consistent with a recent study showing that youth have more positive alcohol-related cognitions at moments of exposure to alcohol ads than at other times (Martino et al., 2016).

That study, Tracking and Recording Alcohol Communications (TRAC), used ecological momentary assessment, an intensive, within-subjects design with frequently repeated measures (Shiffman, Stone & Hufford, 2008). Middle school students carried handheld devices throughout the day and recorded each alcohol ad as they encountered it. After logging each ad, they completed a short survey assessing their alcohol-related beliefs at that moment. In addition, at three random times during the day, the device signaled students to complete the same survey. Beliefs about alcohol were more positive at moments of exposure to ads compared to these random (control) moments. During exposure, adolescents saw alcohol use as more prevalent among their same-age peers and saw the typical drinker their age more positively, suggesting that alcohol advertising may indeed influence normative beliefs and drinker prototypes, in line with prior theory.

However, the likelihood and extent of shifts in alcohol-related beliefs associated with ad exposure is also theorized to depend upon the way that youth appraise and/or interpret advertising messages. Building on decades of research into dual process and information processing models of attitude change (Albarracín & Vargas, 2010; McGuire, 1972; Petty & Cacioppo 1981), the Message Interpretation Process (MIP) model (Austin, Pinkleton, & Fujioka, 2000) theorizes that ad appraisals (in the form of liking), identification with people in ads (consistent with earlier work by Cialdini on social proof; Cialdini, 1993), and skepticism toward ads play key roles in determining advertising impact. Formally, the MIP theorizes that skepticism is based in a comparison of advertising portrayals and messages to personal experience--a logic-based process. At the same time, affective reactions to ads

(liking), are automatically evoked. The relative strength and consistency (pro- or anti-alcohol) of these responses in turn predicts identification, the hypothesized proximal determinant of belief change. However, in practice, studies have found that each of these constructs directly predicts alcohol-related beliefs and drinking, in addition to showing some of the indirect associations hypothesized by MIP. For example, in an early test of the model, Austin and Knaus (2000) conducted a survey of 6th – 9th graders and found that desirability (liking) of alcohol advertising portrayals and identification with the people in those portrayals predicted positive alcohol expectancies (beliefs that drinking leads to positive outcomes), which in turn predicted drinking. A similar study from another research lab also found that liking of alcohol ads was associated with positive alcohol expectancies among teens (Fleming, Thorson, & Atkin, 2004). More recently, Austin and colleagues tested the role of MIP variables by surveying 9 to 17 year olds. Structural equation modeling suggested that both skepticism and identification mediated associations between alcohol advertising exposure and drinking. Skepticism evoked by alcohol ads was associated with greater negative alcohol expectancies, whereas identification with ads was associated with reductions in negative expectancies, as MIP would predict. The link between advertising exposure and positive expectancies was mediated by ad liking, as well as by identifying with people in alcohol ads. Negative expectancies were, in turn, associated with less drinking, and positive expectancies with more drinking (Austin, Chen, & Grube, 2006).

A related perspective to that of the MIP is found in a fairly recent body of research examining “receptivity” to alcohol marketing. Receptivity has been defined as the development of positive affect toward advertising (Pierce et al., 1998) as well as “a willingness to be open and responsive to the sponsor’s ideas, impressions, and suggestions” (p. 29, Henricksen et al., 2008). Henricksen et al. (2008) operationally defined liking/receptivity as owning or wanting an alcohol promotional item or having a favorite alcohol ad; 41% of their middle school youth sample met one of these criteria. Those who met both criteria were more likely to initiate alcohol use by follow-up compared to those who met neither criterion. Similarly, in a cross-sectional analysis from a study of middle school students in the Northeast U.S., ownership of an alcohol promotional item was associated with recent drinking initiation, but only among girls. Most recently, McClure and colleagues (2013) found that 15–20 year old youth who owned an alcohol promotional item were more likely to binge drink, and that this association was partially explained by a set of alcohol related cognitions.

In summary, several studies link differences in appraisals of alcohol ads to differences in drinking or beliefs about drinking, and a few studies link differential ad skepticism and differential identification with people portrayed in alcohol ads to adolescents’ drinking beliefs. But the designs of these studies make it difficult to ascertain whether a positive response to alcohol advertising is a contributor to youth drinking or merely a harbinger of its onset. Perhaps most telling in this regard is a study by Unger and colleagues (1995). These researchers found that among nondrinking youth, liking of a set of alcohol ads distinguished those who were committed to remaining nondrinkers from those who said it was possible or likely that they might drink in the future. While these researchers focused on this as evidence that ad receptivity precedes drinking, the data also show that those who are more receptive to alcohol ads have a greater propensity to drink, regardless of future ad exposure.

Indeed, both receptivity to alcohol advertising and drinking might be explained by a third factor. A portion of the between-person variance in attitudes toward alcohol is explained by genetics (Perry, 1973), and this predisposition might explain both greater liking of alcohol ads among some youth and these youth's eventual drinking. Likewise, impulsive personality is associated with attitudes that are more reactive to external information, such as advertising (Albarracín & Vargas, 2010), as well as with underage drinking.

This difficulty in teasing apart the roles of unmeasured drinking propensity and advertising receptivity is inherent to correlational research, but particularly pronounced in between-person analyses. Within-person approaches that examine whether variation in the same person's responses to different advertisements is associated with fluctuations in his or her alcohol-related cognitions have the potential to address this issue. When an individual serves as his or her own control, liking some alcohol ads and not others, feeling skeptical of some but not all, etc., it is less likely that an underlying propensity to drink explains both positive appraisals of ads and any positive beliefs about alcohol that may co-vary with these appraisals at particular points in time. Evidence of a within-person association between positive alcohol advertising appraisals and more positive alcohol beliefs would substantially advance our scientific understanding, providing stronger evidence that ad processing may play a causal role in moderating advertising effects.

To examine this possibility, a reanalysis of data from the TRAC study was conducted, investigating whether the previously documented within-person momentary associations between exposure to alcohol advertising and beliefs about alcohol depend on ad appraisals. Based on the MIP model, the present study hypothesized that ads that evoked liking and identification and that quelled skepticism would be associated with more positive shifts in adolescents' beliefs about alcohol than ads that elicited less favorable/more critical appraisals.

Methods

Participants

Researchers recruited 606 middle school students from two large school districts, after school clubs, and community organizations in Southern California with flyers and other notices. Enrollment occurred on a rolling basis over 10 months (September 2013 to June 2014). Study staff talked with parents by phone to determine adolescents' eligibility. Adolescents were eligible to participate if they were 11–14 years old, could speak and write English, and their parents did not report that they had a mental or psychological condition that would preclude participation. More than one youth per family was eligible provided that each youth met all eligibility criteria. Parents provided written consent and youth provided verbal assent to participation. All study procedures were reviewed and approved by the RAND Corporation's IRB.

General Procedures

Each participant and a parent/guardian came to a neighborhood study center for assessment and training immediately prior to beginning the EMA protocol. During this session,

adolescents completed a paper questionnaire that assessed demographic information, intentions to drink alcohol in the next six months (1 = *definitely no* to 4 = *definitely yes*), and lifetime alcohol use (even a sip), and were trained to use a handheld device for EMA. The standardized training consisted of a 60-minute oral presentation accompanied by electronic slides. Participants were also given a phone number for technical support throughout the study. The median number of participants per training session was nine.

EMA Procedures

Each participant was issued a handheld data collection device with custom-built EMA software installed. Various devices were used, including the Samsung Galaxy Player, Samsung Galaxy Mini, Samsung Galaxy Y Duos, and HTC Explorer. The same data collection application was used regardless of device. All device functions besides the EMA software were inaccessible to participants. Data were encrypted and secure on the device, and each device required a password for entry. Youth were instructed to keep their device with them at all times except while at school, charge the device at night while they slept, initiate data entry each time they encountered an alcohol advertisement, and respond to random prompts when issued (see below). Participants were told to practice using the device during the training day and that the study's data collection period would begin the following day and continue for 14 total days. Before leaving the study center, youth practiced recording an advertisement and responding to a random prompt (practice data were excluded from the analysis). At the end of the assessment, participants returned the device to the study center where all data were automatically uploaded.

All participants earned \$60 for completing the baseline questionnaire, attending training, and carrying the device for 14 days. To incentivize compliance, the study paid an additional \$25 to participants who responded to 76–84% of the random prompts, and an additional \$60 to participants who responded to 85% of the random prompts.

EMA Surveys

Exposure event reports—Participants were instructed to initiate an assessment whenever they encountered an alcohol advertisement during the 14-day monitoring period. Instructions emphasized that youth should not deviate from their normal activities to “find” advertisements. They reported exposure to television, radio, newspaper, and magazine advertisements; billboards; sponsorship of music and sporting events; retail point-of-sale advertisements; brand-logoed items such as hats and t-shirts; and various forms of online advertising, including banner advertisements, video advertisements, and advertisements appearing on social networking sites such as Facebook, Twitter, Instagram, and Tumblr. Youth also recorded exposures to movies and music in which specific brands of alcohol were shown or mentioned. During training, participants were taught to distinguish portrayals of alcohol use in movies or music that are incidental or generic vs. portrayals in which an alcohol brand is evident. At each exposure assessment, youth responded to a brief series of close-ended questions about the ads and about their alcohol-related cognitions (see *Measures*, below).

Random prompt reports—Three times a day, the device prompted participants to complete a brief (approximately 1 minute) assessment of alcohol-related beliefs. The purpose of the random prompt reports was to provide an assessment of students' beliefs at times when they were not exposed to alcohol advertising. Audible prompts alerted participants that it was time to complete a random prompt survey. These assessments were spread throughout the day using a sampling schedule stratified by period of day (Shiffman, 2007). On school days, one random prompt was issued between 7am and 8am, one between 3pm and 6pm, and one between 6pm and 9pm. On non-school days, one prompt was issued between 9am and 1pm, one between 1pm and 5pm, and one between 5pm and 9pm. If a signal occurred during an activity they could not interrupt, participants were instructed to temporarily suspend the prompt. Participants could delay the assessment three times for up to 15 minutes, after which an incomplete assessment was recorded as missing.

Measures

Ad Appraisals—Each time an ad exposure event was reported, appraisals of the ad were assessed. To measure *Identification with People in the Ad*, youth were asked “Are there people in the ad? Yes/No.” If they indicated that people were present they were asked to rate their agreement with the statement “I want to be like the people in the ad,” (response options were strongly disagree, disagree, agree, and strongly agree). To measure *Ad Liking* and *Ad Skepticism*, participants indicated their agreement with the statements “I like this ad” and “This ad tries to make drinking seem better than it really is,” on the same response scale used to measure identification. Responses were used to characterize each advertising exposure along each of the three dimensions. Because ratings were highly skewed, we transformed them into a set of dichotomous indicators. The resulting measures were used to classify every advertising exposure along all three dimensions [i.e. as involving *identification* (agree or strongly agree) or *not* (disagree or strongly disagree) *liking* or *not* and *skepticism* or *not*]. The identification dimension also included a third category to reflect exposures to ads that *did not involve people*.

Alcohol-Related Beliefs

At both exposure events and random prompts, participants completed four measures of alcohol-related beliefs. In the case of exposure events, alcohol-related beliefs were assessed after ad appraisals. *Perceptions of the typical person one's age who drinks* (referred to hereafter as “prototype perceptions”) was based on a measure used by Gibbons et al. (2010). Participants were asked to “think about boys or girls your age who drink alcohol” and rate how 1) popular, 2) attractive, and 3) cool they are (1 = *not at all* to 4 = *very*, $\alpha = 0.90$). *Perceived norms* was based on a measure used by Thomsen and Rekve (2006). Participants were asked to indicate their agreement (1 = *strongly disagree* to 4 = *strongly agree*) with the statements, “Most teenagers drink alcohol,” “Most teenagers I know drink alcohol,” and “Most students in my grade drink alcohol ($\alpha = 0.79$).” *Positive outcome expectancies* and *negative outcome expectancies* were based on measures used by Austin et al. (2006). Participants were asked to judge how likely (1 = *not at all* to 4 = *very*) it is that the following outcomes would result “if someone your age had 3 or 4 drinks of alcohol in a row:” feel more relaxed, feel more friendly, and feel happy (positive expectancies $\alpha = 0.90$); get a hangover, feel out of control, and feel sick to their stomach (negative expectancies $\alpha = 0.88$).

Scores on each measure were equal to the average across measure items. See Martino et al. (2016) for additional details.

Statistical Analysis

We used mixed effects regression models (MRMs) for continuous outcomes (Verbeke & Molenberghs, 2000) to compare beliefs about alcohol between moments of exposure to alcohol advertising that was appraised in a particular way (e.g., with or without liking) and random prompts (control reports).

Models account for clustering of observations within an individual and allow for an unequal number of observations across participants and unequal spacing of observations in time. Separate MRMs predicted prototype perceptions, positive and negative outcome expectancies, and perceived norms. Each model focused on a particular appraisal variable (identification, skepticism, or liking). Thus, twelve MRMs were run in all (4 alcohol-related beliefs for each of the 3 appraisal variables).

Formally, the MRM for belief y of student i ($i = 1, \dots, N$ students) at assessment j ($j = 1, \dots, n_j$ assessments) is specified as follows:

$$y_{ij} = \mu_i + \theta ad_{ij} + x'_{ij} \beta + \varepsilon_{ij},$$

where y_{ij} is a survey measure (e.g. prototype perceptions) for the i th student at assessment j , ad_{ij} is a set of indicators that compare beliefs measured at the time of exposure to ads appraised in a particular way (e.g., liked ads and disliked ads) to beliefs measured at random prompts, θ is the average change in belief as a function of exposure to an alcohol advertisement that was appraised in a particular way (i.e., the fixed effect for exposure), and μ_i is a student-specific normally-distributed random effect, which allows each student to have a distinct average level of beliefs and captures clustering of reports by subject. x'_{ij} is a vector of covariates and β is the corresponding vector of fixed effects for the covariates. The vector of covariates included age, gender, race/ethnicity, and intentions to drink alcohol. ε_{ij} is a normally-distributed error term representing the part of y_{ij} that cannot be predicted by the model's explanatory variables.

We used a first-order autoregressive model to account for serial correlation of errors. It assumes that the correlation between two assessments decreases exponentially as a function of the time interval separating them, a common assumption in the analysis of short-term repeated measures models (Wang, Hamaker, & Bergeman, 2012).

Nonresponse—Compliance with random prompt surveys averaged 67% or approximately 2 of 3 scheduled prompts per participant per day. A detailed analysis of exposure reports provided evidence of a fatigue effect (Courvoisier et al., 2012) as well: Participants reported steadily decreasing numbers of advertisements as the monitoring period progressed, suggesting missing exposure data in the later portion of the field period. A particularly large drop in reported exposures to alcohol advertisements on the fourteenth day of data collection raised concerns that the majority of participants may not have been aware that they were

required to report exposures on this day. Thus, analyses only examine reports logged on the first 13 days of data collection.

Results

The characteristics of the analysis sample of 589 participants are shown in Table 1. Five participants lost or broke their device and thus their data were irretrievable. An additional 12 participants did not respond to any of the random prompts and one student withdrew from the study. Data from these 18 participants were not included in analyses described here.

Across the 13-day monitoring period, participants reported exposures to an unweighted total of 6,695 advertisements, or 23,446 after weighting (see Collins et al., 2016, for details on ad characteristics). As indicated in Table 2, positive responses to advertising were relatively uncommon: Overall, 11% of alcohol ads had people in them that youth identified with, 15% of ads were liked by participants, and participants were unskeptical of 43% of ads. The most common scenario youth reported was exposure to an ad that they did not like, that did not include people, and that they were skeptical of (29% of all ads). Only 1% of reports described exposure to an ad that participants were not skeptical of, that contained people with whom they identified, and that they liked. Responses to the remaining ad exposures were mixed.

Ad Liking

The first row of Table 3 displays the coefficients for our models comparing participants' alcohol-related beliefs at moments of exposure to ads that they liked to their beliefs when they were queried randomly (at moments of nonexposure). Consistent with hypotheses, beliefs during exposure to liked ads were significantly more positive than beliefs at moments of nonexposure, with teens seeing drinking as more normative among their peers, viewing the typical teen drinker more positively, and seeing drinking as more likely to result in positive outcomes and less likely to result in negative outcomes. When participants did *not* like an ad to which they were exposed, their positive outcome expectancies were slightly more negative and their negative expectancies were unchanged. Counter to hypotheses, normative beliefs and perceptions of the typical drinker were more positive even when ads were disliked ($p < .001$), but this effect was much smaller than the effect associated with ads that were liked (see row 2).

Identification with People in Ads

Identification with people in ads played a similar moderating role in the association between exposure and beliefs as did ad liking. As hypothesized, compared to moments of nonexposure, drinkers were seen more positively at moments of exposure to ads that evoked identification. Drinking was also seen as more normative at such times. Positive and negative outcome expectancies did not differ between moments of nonexposure and moments of exposure to ads that evoked identification. The fourth row of Table 3 shows the coefficients for exposure to ads with which youth did *not* identify. Normative beliefs and positive and negative outcome expectancies were similar at such moments to beliefs reported during nonexposure. Positive beliefs about drinkers were higher at moments of exposure to ads with

which youth did not identify, though the coefficient associated with this effect was less than half the size of the positive coefficient associated with ads that *did* evoke identification.

Ad Skepticism

Contrary to predictions, beliefs about drinking were more positive during exposure to ads that evoked skepticism than at moments of nonexposure. This was the case for norms, drinker prototypes, and negative expectancies. There was no difference in positive expectancies between moments of exposure to ads that evoked skepticism and moments of nonexposure. Conversely, when youth were *not* skeptical of an ad their beliefs about drinking were generally more negative. Positive expectancies were higher and negative expectancies lower, relative to moments of nonexposure. Only drinker prototypes were more positive at moments of exposure to ads that did not evoke skepticism, though this effect was only about half the size of the effect associated with skepticism toward an ad.

Discussion

The MIP model and related theories of persuasion argue that the ways that messages are appraised and processed are critical factors in determining their effects on attitudes and beliefs. Results provide strong support for this argument. When youth liked alcohol ads and identified with the people in them, they viewed drinking in a more positive light than they did during moments of nonexposure to ads. In contrast, when youth encountered ads that they did not like or when they did not identify with the people in alcohol ads, the ads seemed to have little effect on their beliefs.

When combined with our finding that only a small proportion of ads are positively appraised, this would seem to suggest that youth are generally unpersuaded by alcohol ads. This not only conflicts with the body of literature linking ad exposure to more positive alcohol-related beliefs, but with a prior analysis of this same data set (Martino et al., 2016). That study found that alcohol-related cognitions were more positive at times of exposure to alcohol advertising than at times of non-exposure. Several factors may explain this apparent discrepancy. First, the prior study documented significantly more positive perceptions of the prototypical drinker and perceived drinking norms at times of exposure to alcohol ads, but positive expectancies were only marginally affected and negative expectancies were the same at moments of exposure and nonexposure. In the present analysis, *shifts in prototype perceptions were positive even when an ad was negatively appraised*. Although these shifts were much smaller than the shifts observed at moments of positive appraisal, this suggests that message processing dampens the effects of advertising rather than overriding or reversing them, at least in the case of prototype perceptions. To the extent that prototype perceptions drive adolescent drinking, this suggests that policy solutions that place limits on ads that appeal to adolescents or that aim to increase media literacy will greatly reduce any effects of alcohol advertising on youth drinking but may not eliminate such effects.

Another explanation for the overall positive effects of ads probably lies in the individual and combined effects of different aspects of the interpretation process. While few ads were liked, identified with, *and* met with a lack of skepticism, most ads were responded to with at least one form of positive appraisal (i.e. were *either* liked, identified with, or met without

skepticism). The sample did not contain a sufficient number of ads to test for independent effects of the three appraisal dimensions or interactions between them, but the overall effects of exposure documented in the previous TRAC study (Martino et al., 2016) suggest that a positive appraisal on *any* of the studied dimensions may be sufficient to result in shifts toward more pro-drinking beliefs. Future work should attempt to determine whether this is the case.

Finally, about half of ads were met with skepticism, and the role of skepticism was the reverse of that hypothesized. As part of a longitudinal survey of youth, Austin and colleagues (2006) also found that skepticism toward alcohol ads was positively related to ad liking and through this variable predicted more positive beliefs about drinking. In addition, an intervention to increase media literacy resulted in increased liking of ads at the same time that it increased skepticism (Austin et al., 2007). It may be that, as Austin et al. (2007) speculate, in order to see ads as unrealistically positive, they must be appreciated. That is, to see an ad as making drinking “seem better than it really is,” the ad needs to be seen as make drinking seem attractive in the first place. It is also possible that the relationship is an artifact of the items used to measure skepticism. “Skepticism” is not a word that can readily be used in surveys of younger adolescents, leading to the wording used here and in previous studies. Effort should be made in future work to develop an advertising skepticism item or index that is independent of liking, but it is possible that, as Austin and colleagues suggest, these two constructs are inextricably linked.

A key limitation of our data is nonresponse. Compliance with random prompts was measurable and at a level consistent with prior EMA work with adolescents (Gwaltney et al., 2008). It is not possible to determine levels of compliance with instructions to report all alcohol-advertising exposures, but the reduction in reporting later in the field period suggests some events were missed. The lack of complete data may have biased our findings if the events that were not reported, or the people who failed to fully comply with instructions, differ in systematic ways from those we observed. A common practice used to correct for such biases in survey research is the application of inverse probability weights (Rubin, 1996; Li et al., 2013). When we apply weights using a similar method developed specifically for EMA (Kovalchik et al., 2017), results are unchanged from those reported here, suggesting no bias. However, weighting cannot correct bias on unobserved dimensions. Thus, while we could find no evidence of bias in the data presented in this paper, results may differ from what would be obtained with a full sample of event reports from all participants.

This study adds to the literature by showing that the same youth report different beliefs about alcohol in the presence of advertising that they appraise positively, identify with, or are skeptical of, compared to the beliefs that they report in the presence of advertising that they do not like, do not identify with, or are not skeptical of. By minimizing issues of endogeneity with an EMA design, results better support the conclusion that changing how youth respond to alcohol ads can reduce the effects of those ads on drinking than do previous studies, though still fall short of demonstrating a causal association. The study’s within-subjects approach also throws a spotlight on the notion that differences in the characteristics of ads lead youth to respond more positively to some ads than others, and hence, that it is possible to make ads less attractive to youth and potentially also less

impactful. Some research has addressed the characteristics of alcohol ads that make them more attractive to young people. Studies have found that ads that use animals, humor, and music are generally better liked than others (Chen et al., 2005). More study into the characteristics of ads and of youth that affect alcohol advertising appraisals is needed.

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Table 1Participant Characteristics ($N = 589$)

Characteristic	Number	Percentage
Age (years)		
11	140	24
12	153	26
13	161	27
14	133	23
15	2	0.3
Female	268	46
Race/ethnicity		
Non-Hispanic White	146	25
Hispanic	151	26
African-American	170	29
Other	122	21
Intact nuclear family	366	62
Tried alcohol	139	24

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Table 2
Adolescents' Appraisals of Alcohol Advertisements Encountered in Daily Life (%)

Identifies	Is skeptical	Is not skeptical	Subtotal: likes	Subtotal: does not like	Total
Likes	3.9	1.2	5.1		
Does not like	4.3	1.9		6.2	
Subtotal	8.2	3.0			11.2
Does not identify					
Likes	1.2	0.6	1.9		
Does not like	13.7	9.0		22.7	
Subtotal	15.0	9.7			24.6
No people					
Likes	5.2	3.0	8.3		
Does not like	28.6	27.3		55.9	
Subtotal	33.8	30.3			64.2
Total	57.0	43.0	15.2	84.8	100.0

Note: Entries are percentages of all ads encountered.

Table 3

Results of Mixed Effects Regression Models Predicting Alcohol-Related Beliefs at Moments of Alcohol Advertising Exposure (versus NonExposure) from Ad Appraisals and Covariates (Std Beta)

Appraisal	Perceived drinking norms	Positive drinker prototype	Positive alcohol expectancies	Negative alcohol expectancies
Liked ad	.104 ^{***}	.344 ^{***}	.040	-.059 [*]
Did not like ad	.023 [*]	.067 ^{***}	-.025 [*]	-.005
Identified with people in ad	.045 ^a	.295 ^{***}	.022 ^a	-.020 ^a
Did not identify with people in ad	-.012	.117 ^{***}	-.027 ^a	-.001 ^a
No people in ad	.049 ^{***a}	.076 ^{***}	-.017 ^a	-.016 ^a
Skeptical of ad	.046 ^{***a}	.136 ^{***}	.010	-.064 ^{***}
Not skeptical of ad	.020 ^a	.075 ^{***}	-.050 ^{***}	.055 ^{***}

Note. Results come from 12 models, 1 for each of the 3 appraisal dimensions separately predicting each of the four alcohol-related beliefs. Models adjusted for participant age, gender, race/ethnicity, and intention to drink alcohol.

* p < .05,

** p < .01,

*** p < .001.

^a Coefficients within ad appraisal categories (e.g., associations between liked ads vs not liked ads and perceived drinking norms) were also compared to each other.

We indicate cases in which coefficients within an ad appraisal category do not differ, p < .05, by labeling them with a common superscript.