Internet Alcohol Marketing Recall and Drinking in Underage Adolescents

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Abstract

Objective: Evidence suggests that adolescents are exposed to alcohol marketing in digital media. We aimed to assess recall of Internet alcohol marketing and its association with underage drinking.

Methods: New England adolescents age 12 to 17 years (N = 202) were recruited from a pediatric clinic. Subjects completed an online survey assessing: 1) general simple recall of Internet alcohol marketing and 2) image-prompted recall of specific Internet alcohol marketing channels (display ads, commercials, brand websites, and brand social media pages). Cross-sectional associations between recall (simple and image-prompted) and ever-drinking were each assessed in regression analysis adjusting for age, gender, race, parent education, ever-smoking, media use, sensation-seeking, peer/parent drinking, parent monitoring/responsiveness, and parent Internet monitoring.

Results: In this sample (M_{age} = 14.5 years; 55% female; 89% white; high parent education), 20% reported ever-drinking and 87% recalled Internet alcohol marketing. Of the latter, 67% recalled display ads, 67% Internet commercials, 5% websites, and 5% social media pages. In logistic regression, higher simple Internet alcohol advertising recall was independently associated with higher odds of ever-drinking for simple (adjusted odds ratio: 2.66 [1.04,6.83]) but not for image-prompted recall.

Conclusions: Despite controlling for potential confounders, simple recall of Internet alcohol marketing was significantly associated with underage drinking whereas image-prompted recall was significant only in bivariate analysis, likely due to small sample and a more limited range of specific channels assessed than those accessed by adolescents. Further longitudinal studies using image-prompted recall and capturing a broader range of internet platforms could be used to better understand adolescent engagement with alcohol marketing and guide policy and prevention efforts.

Keywords: adolescence; advertising; alcohol use; Internet; marketing; youth

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What's New

This study adds to a growing body of literature supporting the link between recalled exposure to Internet alcohol marketing and underage alcohol use. It extends the literature by exploring new image-prompted recall methods to better assess specific marketing exposures on the Internet.

Alcohol continues to be the drug of choice among young people in the United States (US) even during a time of decreasing use.[1] Among students in grades 9 to 12, 60.4% reported ever having had a drink of alcohol, 29.8% reported drinking in the last 30 days, and 13.5% reported binge-drinking (consuming 5 or more drinks in a row, within 2 hours) at least once in the past 30 days.[2] Alcohol use during adolescence is linked with poor school performance, risky sexual behavior, attempting suicide,[3] driving after drinking, and motor vehicle crashes.[4] Early alcohol use increases the likelihood of alcohol use disorders later in life.[5−7] As such, reducing alcohol use among young people is of critical importance.

One factor associated with adolescent initiation of drinking and progression to high-risk drinking − binge drinking and hazardous drinking (as defined by the Alcohol Use Disorder Identification Test)[8] − is exposure to alcohol marketing in traditional media, such as alcohol advertisements on TV, radio, in magazines, and on billboards.[9,10] More recently, alcohol advertisers have shifted their focus to the Internet, where adolescents are not only passively exposed to alcohol marketing messages, but may over time, actively engage with alcohol brands through "liking" ads or pictures, communicating with others on brand web pages, or posting their own branded images.[11−17] Previous work

from our group describing a model of marketing receptivity[18,19] suggests that nondrinking adolescents may be receptive to passive marketing, prompting experimentation with alcohol whereas adolescents who have already experimented with drinking may be more receptive to greater engagement with specific marketing campaigns or brands, subsequently leading to high-risk drinking. The Reinforcing Spirals Model supports this concept by proposing that the relationship between exposure and response is cyclical, progressive, and reinforcing.[20] Beyond interaction with marketing, and extending evidence linking traditional media with engagement with drinking,[10] emerging evidence suggests that exposure to alcohol marketing in online environments is also associated with underage drinking.[21–24] However, this research has not explored the specific ways in which adolescents interact with alcohol marketing on the Internet. Thus, a better understanding of adolescent exposure to and engagement with Internet marketing, and the association between exposure and adolescent drinking behavior is important to shape education, regulatory frameworks, and policy efforts. Measures of marketing recall inherently capture not only exposure but attention to that exposure, potentially leading to an affective response and brand engagement. In this pilot study with young-to-middle adolescents, we sought to assess recall of Internet alcohol marketing and its relation with ever-drinking, using both simple recall and piloting a more innovative image-prompted recall methods that could be used to trigger recall and to better assess specific types of Internet alcohol marketing exposure beyond simple recall.

Methods

Recruitment and Survey Methods

Between December 2015 and October 2016, a convenience sample of 202 New England adolescents aged 12 to 17 years was recruited from a general pediatrics clinic for a web-based survey of adolescent media and marketing exposure. Through a partial Health Insurance Portability and Accountability Act waiver, eligible adolescents from our pediatric clinic were identified through the electronic medical record and contacted by phone until our desired sample of 200 participants was reached. Callers first obtained verbal parental permission and basic demographic information and then adolescent assent. Assenting adolescents were directed to complete the online survey. Overall 55% of contacted participants agreed to participate in the study and 83% of these completed the survey. To ensure confidentiality, participants were provided with an ID and password. The study was approved by the Committee for the Protection of Human Subjects at Dartmouth College.

Measures

Outcome Measures

The primary outcome measure was ever-drinking ("*Have you ever had a drink of alcohol, other than a few sips?" No, Yes*).[25]

Exposure Measures

Simple Internet alcohol marketing recall.—Recalled frequency of exposure to Internet alcohol marketing was assessed by asking participants "*Tell us how often you see or hear this type of alcohol advertising.*" This measure was developed to assess exposure across multiple advertising channels. For this analysis, the category of Internet marketing was assessed by: "*Internet advertising for alcohol brands (for example − alcohol commercials on the Internet before movies or videos, display or pop-up ads, brand websites or social media pages, etc).*" Given low proportions of adolescents in extreme categories, response categories (*never, rarely, sometimes, often, and very often)* were collapsed into "*never/rarely,*" "*sometimes,*" and "*often/very often*" for analyses.

Image-prompted recall of Internet alcohol marketing types.—Using a modified version of cued-recall methods validated in previous studies,[18,26] subjects who responded affirmatively to having seen any Internet alcohol advertising were then assessed for exposure to and engagement with 4 specific types of alcohol marketing using image-prompted recall.[18] Example images were provided to prompt recall of both passive exposures such as display ads (online ads such as banner ads that include images, audio and video to engage the consumer) and alcohol commercials, as well as recall of brand-sponsored websites, and brand-sponsored social media pages that could represent more active engagement with marketing. For example, the survey item for social media was *"Many alcohol brands have official social media pages like the ones shown here for xx brand on Facebook and xx brand on Twitter [image of official brand social media home page provided]. Have you ever been to an alcohol brand social media page?" (No, Yes)*. Based on our previous work,[19,23] a composite image-prompted alcohol advertising recall score (0−3) was created to assess cumulative levels of noticing and engaging with marketing by summing endorsed items.

Covariates

A number of covariates were included that might influence the association between recall of alcohol marketing and drinking through marketing exposure and/or drinking behaviors. Socio-demographic variables included age, sex, race (dichotomized to *white* and *non-white* given few non-white participants), and parent education. Personality characteristics and social influences included sensation-seeking, and parent and peer drinking. Sensation-seeking was derived from agreement with statements such as "*I like to do frightening things*" or "*I like to explore strange places*" (6 items, alpha = .72)[27]; peer drinking was assessed by asking "*How many of your friends drink alcohol? Would you say… None, A few, More than a few, Most*?"; and parent drinking by "*Which of the following statements best describes how often your mother/father drinks alcohol? Would you say…Never, Occasionally, Weekly, Daily*?" For parent drinking, if 2 parents were reported, the higher parent report was included.[28] Lifetime smoking

(*ever/never*) was included as a control for adolescents who are at higher risk for substance use generally.[25]

Time spent on TV, the Internet, and on social media was assessed as a control for general media time so as to demonstrate independent associations between recall of Internet alcohol marketing and youth drinking. General TV time was assessed by asking "*On [WEEKDAYS/WEEKENDS], how many hours a day do you watch TV?" (None, 1/2 hour/day, 1 hour/day, 2 hours/day, 3 hours/day, 4 hours/day, 5 or more hours/day).* A sum score and mean for TV time was calculated across weekends/weekdays and used in the regression model. Two Internet time variables, weekday Internet time and weekend Internet time, were employed to assess recreational use: "*On [WEEKDAYS/WEEKENDS], how many hours a day do you use the Internet for PERSONAL USE, like shopping, reading the news, playing games, checking personal email, or social networking?"* (same response options as TV time above). A sum score and mean across both weekends/weekdays was calculated for personal Internet use. Frequency of social media use was assessed with *"How often do you use social media?" (Never, Rarely, Once in a while, About once a day, and Many times a day*).[23] A mean score was calculated.

Three measures of parenting were assessed, given that parental influence has been previously shown to impact youth drinking behaviors.[29] These included parent monitoring (5 items, eg, how often a parent *"knows where you are and what you are doing after school?"* [Alpha = .70]), parent responsiveness (4 items, eg, how often a parent *"lets you know he/she really cares about you?"* [Alpha = .90]),[30,31] and parent Internet monitoring ("*How closely do your parents monitor your Internet use?" Not at all, not very closely, somewhat closely, very closely*) which was derived for use in this study based on focus group work.

Statistical Analysis

We first examined distributions and bivariate associations between all variables to be modeled and adolescent report of underage ever-drinking. Beyond the recategorization of Internet alcohol marketing recall described above, no variable transformations were required. *t* tests were used to evaluate mean score differences for scaled variables and chi-square tests for categorical variables. We evaluated the full model using multivariate logistic regression with maximum likelihood estimation to identify associations cross-sectionally between exposure to Internet alcohol marketing and underage drinking while adjusting for hypothesized confounders (age, gender, race, parent education, lifetime smoking, television time, Internet time, frequency of social media use, sensation seeking, peer and parent alcohol use, parental monitoring and responsiveness, and parental monitoring of Internet use). While missingness was minimal (approximately 5% missing across the full dataset), multiple imputation was employed in order to mitigate any potential bias, resulting in 100 imputed datasets. M-plus software was used for all model fit testing.[32]

Results

Sample Description

The sample (n = 202) was drawn from a rural, New England population. Table 1 describes characteristics of the full sample (aged 12−17 years; *M* age = 14.5 years, standard deviation = 1.48). Participants were equally divided by gender (55% female), with the vast majority (89%) of respondents identifying as white. The sample included adolescents with high parent-reported education (30% with a Bachelor of Arts and 40% with an advanced degree). Some 42% reported having a few or more friends who drink, and 40% indicated that at least one of their parents drank weekly to daily. Ever-drinking prevalence was 20%. While 77% of participants reported any level of parent Internet monitoring, of these 42% reported parents monitoring "*not very closely.*" Scaled variables (sensation seeking, and parent monitoring and responsiveness) are described in Table 1.

Adolescent Television, Internet, and Social Media Use

Some 71% of adolescents reported weekday television time (19% reported 3 hours or more), while 89% reported weekend time (39% reported 3 hours or more). Personal Internet use was almost universal with 94% reporting any weekday use and 30% reporting 3 hours or more (and 97% any, 66% 3 hours or more on weekends). Frequency of social media use was high in this sample, with 94% using any social media, and 53% reporting using social media "*Many times a day.*"

Adolescent Recall of Internet Alcohol Marketing

In simple recall**,** most participants (87%) reported some exposure to Internet alcohol marketing, with 19% reporting "*often" or "very often.*" Using image-prompted recall, of those noting any recall of Internet alcohol advertising, 67% then reported specifically seeing alcohol display ads, 67% reported exposure to on-line commercials, 5% reported they had gone to alcohol brand websites, and 5% indicated they had gone to alcohol social media pages. The majority of participants indicated encountering 2 or more of the 4 marketing types assessed (mean number of marketing types = 1.43; standard deviation = 0.89).

The Figure illustrates the proportion of adolescents reporting each level of the image-prompted alcohol advertising recall score and rates of ever-drinking by reported cumulative exposures to Internet advertising. Subjects reporting the highest composite score of specific ad type recall (3 or more types of exposure) had the highest prevalence of ever drinking at 53.8%, however only 8% of adolescents reported this high exposure.

Regression Analyses

Simple Recall of Internet Alcohol Marketing

Table 1 (columns 2 and 3) provides bivariate associations between simple alcohol advertising recall and sample covariates, and underage ever-drinking. Higher frequency

Table 1. Sample Description and Bivariate Association Between Simple Recall of Alcohol Advertising and Ever-Drinking

Variable	*Full Sample (n = 202) N (%)	Nondrinker (n = 159) N (% within row)	Drinker (n = 39) N (% within row)	*P* value
Age				<.0001
12	11 (5)	10 (91)	1 (9)	
13	53 (26)	52 (98)	1 (2)	
14	45 (22)	39 (91)	4 (9)	
15	34 (17)	25 (76)	8 (24)	
16	34 (17)	24 (71)	10 (29)	
17	25 (12)	9 (38)	15 (62)	
Gender				.281
Male	92 (46)	68 (76)	21 (24)	
Female	110 (55)	91 (83)	18 (17)	
Race/ethnicity				.572
White	180 (89)	143 (81)	34 (19)	
Other	22 (11)	16 (76)	5 (24)	
Parent education				.721
HS diploma and/or some college or associate's degree	60 (30)	48 (83)	10 (17)	
Bachelor's degree	61 (30)	47 (77)	14 (23)	
Advanced degree	81 (40)	64 (81)	15 (19)	
Lifetime smoking				<.0001
No	183 (93)	154 (84)	29 (16)	
Yes	14 (7)	4 (29)	9 (64)	
Television time†	5.0 (3.2)	5.1 (3.1)	4.6 (3.4)	.434
Personal Internet time†	6.5 (3.4)	6.2 (3.2)	7.6 (3.2)	<.05
Social media frequency†	3.2 (1.3)	3.0 (1.2)	3.7 (0.6)	<.0001
Sensation seeking†	1.3 (0.6)	1.2 (.5)	1.6 (0.6)	<.0001
Friend alcohol use				<.0001
None	111 (58)	107 (97)	3 (3)	
A few	51 (27)	35 (71)	14 (29)	
More than a few	20 (10)	6 (32)	13 (68)	
Most	10 (5)	1 (10)	9 (90)	
Parent alcohol use				<.0001
Never	22 (11)	20 (91)	2 (9)	
Occasional	98 (49)	86 (91)	9 (9)	
Weekly	48 (24)	30 (63)	18 (37)	
Daily	32 (16)	21 (68)	10 (32)	
Parental monitoring†	2.46 (.49)	2.56 (.40)	2.10 (.57)	<.0001
Parental responsiveness†	2.23 (.73)	2.27 (.71)	2.13 (.72)	.289
Parent Internet monitoring				<.0001
Not at all	44 (23)	25 (57)	19 (43)	
Not very closely	62 (33)	49 (80)	12 (20)	
Somewhat closely	65 (34)	60 (95)	3 (5)	
Very closely	19 (10)	16 (84)	3 (16)	
Internet alcohol recall				.023
Never/rarely	89 (45)	75 (86)	12 (14)	
Sometimes	70 (36)	56 (81)	13 (19)	
Often/very often	38 (19)	24 (65)	13 (35)	

*Values for the full sample do not always equal sums of values for drinkers and nondrinkers due to missingness.

†Values for television time, Internet time, sensation seeking and parental monitoring and responsiveness are mean scores (standard deviations).

of simple Internet alcohol marketing recall was associated with ever-drinking ($P = .023$). As expected, older adolescents and those who reported lifetime smoking were also more likely to have initiated drinking, as were teens with higher sensation seeking, higher frequency of social media and personal Internet use, and friends or parents who drank. Lower parental monitoring and lower parental *Internet* monitoring were significantly associated with underage drinking ($P < .0001$).

Table 2 shows results from the multivariate logistic regression analysis assessing associations between simple alcohol advertising recall and ever-drinking. After other risk factors were included, recalled frequency of simple Internet alcohol marketing exposure was independently associated with greater odds of underage drinking (adjusted odds ratio [AOR] 2.66, 95% confidence interval [CI] [1.04, 6.83]). In the final model, covariates that retained an independent association with underage drinking included lifetime smoking (AOR 5.81, 95% CI [1.01, 33.59]), sensation-seeking (AOR 4.58, 95% CI [1.07, 19.69]), having friends who drink (AOR 4.67, 95% CI [1.85, 11.79]), and having parents who drink (AOR 3.13, 95% CI [1.33, 7.34]).

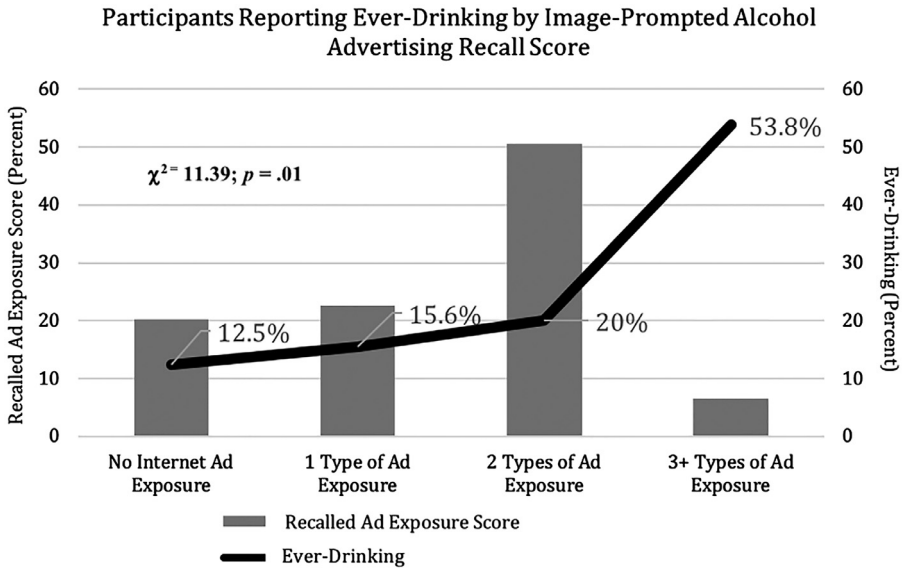

Figure. *Number of participants and proportion of drinkers within categories of Internet marketing exposure (alcohol brand displays ads, Internet commercials, brand websites, and brand social media sites.*

Image-Prompted Recall of Internet Alcohol Marketing

Bivariate analysis using the composite image-prompted alcohol advertising recall score was significantly associated with underage drinking (chi-square = 11.39; *df* = 3; *P* = .01), but significant effects were not retained in multivariate regression (Table 3).

Discussion

In this study, simple recall of Internet alcohol marketing was both commonly reported and independently associated with underage drinking. Even with rigorous controlling of a wide array of confounders, including overall time spent with media, the link between higher simple recall of Internet alcohol marketing exposure and adolescent drinking remained. The results of this study support previous findings of a positive association between exposure to varied forms of alcohol marketing and adolescent drinking, including Internet alcohol marketing.[9,10,18,23,33] This work adds to the literature, including our previous work demonstrating longitudinal associations between Internet marketing receptivity and binge-drinking,[23] by assessing additional covariates, in particular parenting and parent Internet monitoring practices, as well as controls for overall media time on multiple channels (TV, Internet, and social media) to assure that associations between Internet ad exposure and drinking do not simply reflect less parental guidance and greater exposure to alcohol content in media more broadly.

Consistent with previous work, youth characteristics that capture propensity for risk taking, such as sensation-seeking and ever-smoking, were associated with ever-drinking in this study as were important social influences such as peer and parent drinking.[3,23] Further, results are consistent with the marketing receptivity model which

Table 2. Adjusted Association Between Simple Recall of Internet Alcohol Advertising and Ever-Drinking

Variable	AOR (95% CI)
Internet alcohol advertising recall	2.66 (1.04, 6.83)
Age	1.50 (0.83, 2.70)
Gender (ref female)	1.33 (0.33, 5.38)
Race (ref Non-White)	1.89 (0.29, 12.36)
Parent education	1.48 (0.65, 3.36)
Lifetime smoking	5.81 (1.01, 33.59)
Television time	0.92 (0.73, 1.17)
Internet time	0.94 (0.75, 1.19)
Social media frequency	3.35 (0.94, 12.01)
Sensation-seeking	4.58 (1.07, 19.69)
Friend alcohol use	4.67 (1.85, 11.79)
Parent alcohol use	3.13 (1.33, 7.34)
Parental monitoring	0.37 (0.06, 2.41)
Parent responsiveness	1.32 (0.50, 3.49)
Parent Internet monitoring	0.61 (0.25, 1.50)

CI indicates confidence interval.

Table 3. Adjusted Association Between Image-Prompted Recall of Internet Alcohol Advertising and Ever-Drinking

Variable	AOR (95% CI)
Cued Internet alcohol advertising recall	1.61 (0.72, 3.60)
Age	1.53 (0.89, 2.64)
Gender (ref female)	1.92 (0.55, 6.74)
Race (ref Non-White)	1.46 (0.24, 8.92)
Parent education	1.35 (0.64, 2.89)
Lifetime smoking	3.22 (0.84, 12.34)
Television time	0.95 (0.78, 1.17)
Internet time	1.03 (0.83, 1.27)
Social media frequency	3.13 (0.91, 10.11)
Sensation-seeking	5.04 (1.31, 19.46)
Friend alcohol use	4.46 (1.87, 10.65)
Parent alcohol use	2.44 (1.18, 5.06)
Parental monitoring	0.50 (0.14, 1.79)
Parent responsiveness	1.29 (0.53, 5.49)
Parent Internet monitoring	0.66 (0.31, 1.42)

CI indicates confidence interval.

posits that exposure and attention (for receptive adolescents) to alcohol marketing may coincide with initiation of drinking.[19] Finally, using image-prompted recall this study explored a more specific method of measuring ad exposures types (eg, display ads, web sites, commercials, and social media sites), which showed promise in bivariate analysis but did not achieve significance in multivariable regression.

In this sample, most participants recalled seeing any alcohol marketing. Given the ubiquitous nature of adolescent engagement with digital media and the shift among advertisers to this media, adolescents are likely to be exposed to alcohol marketing even more often than they reported here, and capturing exposure is challenging.[34] It is likely that for every recalled exposure, there are many more which they do not recall including branded imagery from entertainment and social media that may not be distinguishable as marketing.[34–36] More specific tests of these associations can be accomplished with dynamic and continuous assessments such as ecological momentary assessment, used previously to capture real-time exposure to alcohol and tobacco marketing.[37–39] Short of such intensive methods, we piloted a more precise assessment with our image-prompted recall methods.

In the image-prompted recall assessment, and consistent with previous work, the majority of adolescents in this regional sample who reported online ad exposure recalled seeing display ads and commercials, while only a small subset reported actively engaging with marketing by going to brand websites and social media pages.[23] This method of cued-recall has been used previously to assess exposure to ads or branding in movies and on TV.[18] As compared to movies and TV, online content is more diverse and rapidly evolving, thus an adapted cued-recall measure that captures representative images for various platforms or channels could serve as a powerful tool to better prompt recall of specific online content, including brands. Results from this regression were consistent with the regression modeling simple recall with significant associations between sensation-seeking and peer/parent alcohol, and ever-drinking. The negative finding for image-prompted recall in this pilot study could very well represent both small sample size and the limited number of channels assessed. For example, exposures to YouTube, Snapchat, Instagram, and other Internet channels were not assessed with cued-recall and hence the method fails to approximate the broad array of exposures captured by the simple recall measure. Further studies employing image-prompted assessments but with greater sample size, a broader array of web images, and a more diverse subject population would be an important next step in understanding how adolescents specifically engage with Internet marketing. Further, it could help researchers to understand what types of marketing resonate with adolescents and how specific marketing messages and brands influence underage alcohol use and high-risk drinking.

The US alcohol industry has agreed to voluntary codes to limit marketing exposure to youth, and to limit the appeal of any marketing imagery or themes to those over the legal drinking age of 21.[40,41] These codes apply to traditional media as well as to digital media, however, Critchlow et al describe the complexity of implementation and enforcement of measures that restrict Internet exposure to alcohol marketing.[42] A common method to restrict alcohol-related content to those above the legal drinking age is use of "age-gating" tools on alcohol brand websites and social media sites. Evidence suggests that this method is largely ineffective at blocking underage access: adolescents can create fictitious legal-aged birth dates to gain entry or create accounts on alcohol brand sites.[17] Beyond access to content on specific sites, the broad availability of the Internet offers significant potential for adolescent exposure to content that would violate alcohol industry marketing codes such as imagery or themes that appeal to or target underage adolescents, content that associates consumption with success or acceptance, or that which favorably depicts irresponsible consumption, among others.[15,43–46] Consistent with this previous work, adolescents in this study reported seeing alcohol advertising on the Internet, and for a small subset, actively engaging by going to brand websites and social media pages. Image-prompted recall could be used to better assess exposure to specific content or websites, and site compliance with marketing codes.

We acknowledge a number of limitations in this study. We included a number of covariates. However, other unmeasured confounders, such as additional alcohol marketing exposures through movies, TV or the built environment as well as more extensive household and individual characteristics, could potentially impact associations between marketing recall and drinking outcomes. In addition, the cumulative exposure across platforms (eg, Internet, TV, movies, billboards, etc) and its potential impact needs to be better quantified.[22] Recall bias is possible given self-reported measures of alcohol advertising exposure, and is why previously validated cued-recall methods are piloted in this study to increase recall precision. This regional New England sample was small, primarily white, and had parents with higher levels of education. Prevalence of ever-drinking was lower than other nationally representative samples, indicating that our sample is likely lower risk and precluding us from analyzing more severe outcomes along the drinking spectrum. While these limitations impact generalizability of findings, they also suppress the likelihood of obtaining statistical significance for our test variable, which provides confidence in the significant association identified between alcohol marketing recall and drinking status. Generalizability to other populations, especially ones further along the drinking spectrum, should be a focus for future studies.

Importantly, cross-sectional associations do not preclude the possibility that adolescents who are curious about, receptive to or experimenting with drinking may seek out alcohol marketing on the Internet. This is consistent with the reinforcing spirals model as well as previous longitudinal studies showing that the relation is reciprocal

and that marketing receptivity is both a risk factor for future drinking as well as a marker for adolescents who have already begun to drink or contemplate drinking, and thus are more attentive to and potentially responsive to alcohol marketing messages. Future studies with prospective data, structural equation modeling techniques, and a range of alcohol outcomes (from any use to binge-drinking and hazardous drinking) could better define these complex pathways.[47]

In this sample, adolescents report spending a large portion of their time on the Internet and social media, and recall encountering alcohol marketing online. This study adds to a body of literature which aims to demonstrate a causal link between online alcohol marketing and alcohol use by providing a more nuanced look including specific sites accessed and types of advertising seen. Despite the small sample size, this study demonstrates a robust effect between simple recall of alcohol marketing and alcohol use, even when accounting for multiple confounders. It also describes new methods for further refining the assessment of alcohol advertising exposure online. Given adolescents' ease of access to alcohol marketing, a better understanding of adolescent engagement with Internet alcohol marketing as well as potential moderators of the association between marketing exposure and adolescent drinking is a priority. This work could inform regulatory frameworks by allowing for more precise assessment of underage alcohol marketing exposure. It could guide parents and pediatricians in counseling youth and helping them to navigate online marketing messages.[48]

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