Internet Alcohol Marketing and Underage Alcohol Use

Auden C. McClure, MD, MPH,^{a,b} Susanne E. Tanski, MD, MPH,^{a,b} Zhigang Li, PhD,^c Kristina Jackson, PhD,^d Matthias Morgenstern, PhD,^e Zhongze Li, MS,^f James D. Sargent, MD^{a,b}

abstract

BACKGROUND AND OBJECTIVE: Internet alcohol marketing is not well studied despite its prevalence and potential accessibility and attractiveness to youth. The objective was to examine longitudinal associations between self-reported engagement with Internet alcohol marketing and alcohol use transitions in youth.

METHODS: A US sample of 2012 youths aged 15 to 20 was surveyed in 2011. An Internet alcohol marketing receptivity score was developed, based on number of positive responses to seeing alcohol advertising on the Internet, visiting alcohol brand Web sites, being an online alcohol brand fan, and cued recall of alcohol brand home page images. We assessed the association between baseline marketing receptivity and both ever drinking and binge drinking (≥ 6 drinks per occasion) at 1-year follow-up with multiple logistic regression, controlling for baseline drinking status, Internet use, sociodemographics, personality characteristics, and peer or parent drinking.

RESULTS: At baseline, ever-drinking and binge-drinking prevalence was 55% and 27%, respectively. Many (59%) reported seeing Internet alcohol advertising, but few reported going to an alcohol Web site (6%) or being an online fan (3%). Higher Internet use, sensation seeking, having family or peers who drank, and past alcohol use were associated with Internet alcohol marketing receptivity, and a score of 1 or 2 was independently associated with greater adjusted odds of initiating binge drinking (odds ratio 1.77; 95% confidence interval, 1.13–2.78 and odds ratio 2.15; 95% confidence interval, 1.06–4.37 respectively) but not with initiation of ever drinking.

CONCLUSIONS: Although high levels of engagement with Internet alcohol marketing were uncommon, most underage youths reported seeing it, and we found a prospective association between receptivity to this type of alcohol marketing and future problem drinking, making additional research and ongoing surveillance important.

Departments of ^aPediatrics, Geisel School of Medicine at Dartmouth, Lebanon, New Hampshire ^bCancer Control Research Program, Norris Cotton Cancer Center, Lebanon, New Hampshire ^cCancer Epidemiology, Norris Cotton Cancer Center, Lebanon, New Hampshire ^dBiostatistics Shared Resources, Norris Cotton Cancer Center, Lebanon, New Hampshire ^eCenter for Alcohol and Addiction Studies, Brown University, Providence, Rhode Island; and ^fInstitute for Therapy and Health Research, Kiel, Germany

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WHAT'S KNOWN ON THIS SUBJECT: Alcohol is a leading cause of morbidity and mortality among youth. Although evidence linking alcohol marketing to youth drinking is robust, exposure of youth to online alcohol marketing remains understudied despite its potential accessibility and attractiveness.

WHAT THIS STUDY ADDS: This study examines longitudinal associations between engagement with Internet alcohol marketing and alcohol use transitions in underage youth. More than half of adolescents reported some engagement with Internet alcohol marketing, and greater engagement was associated with initiation of binge drinking.

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Alcohol is one of the leading causes of morbidity and mortality among youth, with 35% of high school students reporting drinking and 21% binge drinking in the last 30 days.¹ Problematic alcohol use often begins during adolescence and is associated with poor academic performance, other substance use, unsafe sexual activity, impaired relationships with family and peers, and both unintentional and intentional injury.²⁻⁷ Some 4358 deaths in underage youth are attributable annually to alcohol use, most commonly from motor vehicle crashes or homicide.⁸ Early initiation of alcohol use has negative neuropsychological consequences and predicts a higher risk of alcohol dependence,^{2,5,7,9} making primary prevention of underage alcohol use a key issue to address during adolescence.

Alcohol is heavily marketed by an industry that is shifting emphasis and advertising dollars into the digital environment and fostering consumer engagement that promotes an interactive relationship with a brand; online videos, interactive brand Web sites, social marketing campaigns, immersive virtual reality sites, dynamic product placement, and viral and word-of-mouth marketing strategies all aim to expand the reach and impact of traditional advertising channels.¹⁰⁻²² Cross-platform thematic synergy is common, allowing integration of branded marketing into the personal and social media landscapes and on-demand anytime access to marketing platforms.^{13,14,20,23}

In contrast to tobacco, where advertising is highly restricted by external regulation,²⁴ alcohol companies are bound only by voluntary codes²⁵⁻²⁷ that preclude alcohol advertising in media with >28.4% underaged viewership and require age affirmation mechanisms before users can access alcohol marketing Web sites or pages

controlled by the brand, as well as industry monitoring of sponsored sites for user-generated content. Youth have great potential for exposure to alcohol marketing through the Internet, with some 95% of 12- to 29-year-olds reporting that they use the Internet.²⁸ Moreover, youth are increasingly connected through interactive media, with some 80% of 12- to 17-year-olds²⁸ and 83% of 18- to 29-year-olds participating in social networking sites such as Facebook.²⁹ Youth may be particularly responsive to this new media experience, given its potential for interactive engagement and its integration into peer networks.^{16,19,30}

Although the association between television alcohol marketing and youth drinking has been shown to be robust,³¹⁻³⁷ exposure of youth to online alcohol marketing is understudied. Several studies have examined alcohol brand Web sites and found that sites have features attractive to youth, such as games, downloads, and contests, and that youth may be accessing these sites.^{38,39} Other studies describe alcohol marketing in social media and the potential for engagement with marketing through these peer networks,^{14,15,19-21,40,41} noting the general inadequacy of age restriction mechanisms in preventing exposure and the blurred line between brand and consumer-generated marketing on digital platforms.^{12,16,20,21,42-44} Finally, additional studies have shown cross-sectional associations between individual digital marketing exposure and alcohol outcomes.^{45,46} We are unaware of any longitudinal studies testing prospective associations between engagement with Internet alcohol marketing and drinking behavior in underage youth.

In previous work,⁴⁷ we proposed that receptivity to marketing⁴⁷⁻⁴⁹ is a continuum along which teens go through cycles of exposure and response that begin with passive marketing exposures (eg, television

advertising) and progress to more active engagement in marketing, such as might occur on the Internet. In this model, passive exposures are linked to early transitions (eg, trying alcohol), whereas greater engagement in marketing is associated with later transitions (eg, onset of binge drinking). This model is supported by analyses demonstrating associations between receptivity to alcohol brand references in popular music and drinking and between cued recall of TV alcohol advertising and youth drinking.^{34,37,50} The current study is a first attempt to capture the extent to which adolescents are receptive to and have engaged with Internet alcohol marketing and to measure its association with early and late drinking transitions.

METHODS

Recruitment and Survey Methods

Methods, including details of sample selection, have been published previously.³⁷ Briefly, using random-digit dial landline and cell phone frames, we recruited 3342 youth aged 15 to 23 in 2010 to 2011 for a national survey of youth media and marketing exposure. Verbal parental permission and adolescent assent were obtained for youth <18 years old and verbal consent for those >18 years old. To ensure confidentiality, participants <18 years old answered sensitive questions by using the telephone keypad. The survey was approved by the Committees for the Protection of Human Subjects at Dartmouth College and at Westat (Rockville, MD), a survey research firm. At baseline, participants completed a computer-assisted telephone interview and were then directed to an online image-based survey assessing advertising recall.

The American Association for Public Opinion Research response rate for the computer-assisted telephone interview was 56.3% for the landline

and 43.8% for the cell phone sample (additional information available on request). Compared with the 2011 US Current Population Survey, the unweighted baseline survey sample had fewer young adults, minorities, and participants from the southern United States and more participants from the Midwest. In 2012, a follow-up Web-based survey, which included alcohol outcomes, was completed by 1596 of the 2541 youth completing the baseline survey, for a response rate of 61.7%. Compared with baseline, the follow-up sample had better retention for younger participants and those with higher household income and had higher attrition among those with lowest household income.

All reported analyses were limited to participants <21 years old at baseline and completing both phone and Web baseline assessments ($n = 2012$). Multiple imputation was used to infer missing drinking outcomes at follow-up, and weights were applied to adjust for recruitment selection bias and provide population estimates of key outcomes.

Measures

Outcome Measures

The primary outcome measures were ever drinking ("Have you ever had a whole drink of alcohol more than a sip or taste?" No, Yes) and ever binge drinking ("How often do you have six or more drinks on one occasion?" multiple responses, collapsed into Never, Ever), as defined by the Alcohol Use Disorders Identification Test 6-drink threshold for binge drinking,^{51,52} a more conservative measure of problematic drinking than the 5-drink threshold customarily used for US surveys.⁵³

Exposure Measures: Alcohol Marketing Receptivity (Assessed at Baseline)

To assess different levels of engagement, we created a composite measure of Internet alcohol marketing receptivity that included

recall of ad exposure ("Have you seen any advertising for alcohol on the web?" No, Yes) and engagement with the following Internet marketing strategies: visiting alcohol Web sites ("Have you ever been to an alcohol company website?" No, Yes), recognition of any of 5 specific alcohol brand home page images (No, Yes), and being an online fan ("Are you the on-line fan of any alcoholic beverages such as Bacardi or Jack Daniels?" No, Yes). Items endorsed were summed to create a 0-to-4 Internet marketing receptivity score. Because there were few respondents in the highest categories, scores of 3 or 4 were recoded to create a 0-to-2 score, constraining outliers.

Covariates (Assessed at Baseline)

We controlled for covariates that might influence the association between Internet alcohol marketing receptivity and drinking. Sociodemographic variables included age, gender, and race or ethnicity. Sensation seeking⁵⁴ was derived from survey items that asked whether youth agreed with statements such as "I like to do frightening things" or "I like to explore strange places" (6 items, $\alpha = 0.72$). We assessed peer drinking ("How many of your friends drink alcohol?" None, A few, More than a few, Most) and parent drinking ("Which of the following statements best describes how often your mother/father drinks alcohol?" Never, Occasionally, Weekly, Daily) (combined score was collapsed into Never–Occasionally and Weekly–Daily). An Internet time variable was included to test the specificity of the Internet marketing variable ("In a typical day, how many hours do you typically use the Internet for personal use, like shopping, reading the news, checking personal email, or social networking? Do not count time spent working or watching TV programs" None, <1 hour, 1–2 hours, 3–4 hours, >4 hours).

Statistical Analysis

For the baseline analysis sample ($n = 2012$), numbers (with proportions) and medians (with interquartile ratio) were determined, as were weighted proportions. We examined weighted bivariate associations between covariates and Internet alcohol marketing receptivity score by using Rao–Scott χ^2 analysis for categorical covariates and F test for continuous covariates.

Longitudinal multivariate logistic regressions were used to assess associations between receptivity and new onset of alcohol outcomes at follow-up (ever-drinking and binge-drinking initiation) among baseline never-drinkers ($n = 898$) and baseline never-binge-drinkers ($n = 1451$), adjusting for covariates. In these analyses, multiple imputation (MICE package in R) was used to impute the wave 2 alcohol outcomes in those lost to follow-up. We created 5 imputed complete data sets. The log odds ratio (OR) estimates were averaged over the results from the 5 data sets, and then the baseline sampling weights were applied to account for survey selection bias, with standard errors also accounting for multiple imputation uncertainty.⁵⁵ Analyses were completed in SAS 9.4 (SAS Institute, Inc, Cary, NC), with variances and standard errors estimated through Jackknife replicate samples.⁵⁶

RESULTS

Sample Description

Sample demographics and risk factor prevalence for the full sample (15- to 23-year-olds) have been reported previously.³⁷ Table 1 describes characteristics of the baseline sample (aged 15–20 years) included in these analyses. At baseline, 63% of the sample was aged 15 to 17 years and 37% 18 to 20 years. The sample

TABLE 1 Sample Characteristics and Bivariate Associations With Internet Alcohol Marketing Receptivity

Variable	Baseline Sample		Bivariate Associations			<i>P</i>
	<i>n</i> (%) ^a or Interquartile Range ^b	% ^c	Score = 0 (%) ^d	Score = 1 (%) ^d	Score = 2 (%) ^d	
Age, y						.005
15–17	1261 (63)	52	38	50	12	
18–20	751 (37)	48	38	44	18	
Gender						.0003
Male	992 (49)	51	32	50	18	
Female	1020 (51)	49	44	44	12	
Race or ethnicity						.035
White	1396 (69)	58	35	51	14	
Black	154 (8)	15	38	47	15	
Hispanic	253 (13)	20	47	35	18	
Mixed or other	209 (10)	8	36	52	11	
Sensation seeking	2.3 (1.9–2.6) ^a		2.1	2.3	2.5	<.0001
Friend drinking						<.0001
None	348 (17)	16	58	37	4	
A few	799 (40)	38	37	52	11	
More than a few	367 (18)	18	36	48	16	
Most	489 (24)	28	29	45	26	
Parent drinking						<.0001
Never or occasional	1413 (70)	72	41	48	11	
Weekly or daily	599 (30)	28	31	45	24	
Internet use, h/d						<.0001
0	61 (3)	3	63	28	8	
<1	480 (24)	22	46	44	10	
1–2	929 (47)	46	34	50	16	
2–3	320 (16)	18	39	47	14	
4+	203 (10)	11	26	48	26	
Ever drinking (baseline)						<.0001
No	898 (45)	41	46	48	6	
Yes	1114 (55)	59	32	47	21	
Binge drinking (baseline)						<.0001
No	1451 (73)	70	43	48	9	
Yes	531 (27)	30	27	45	28	
Internet alcohol marketing receptivity						
Score 0	716 (36)	38				
Score 1	1019 (51)	47				
Score 2	277 (14)	15				
Individual components						
Seen advertising on Web	1194 (59)	55				
Recall of alcohol brand Web pages	265 (13)	16				
Been to an alcohol brand Web site	122 (6)	6				
Online fan of alcohol brand	62 (3)	3				

Analysis limited to respondents with age <21 y and complete data for phone and Web surveys.

^a Column %.

^b Median interquartile range.

^c Weighted column percentage.

^d Weighted row percentage.

was equally divided by gender, with 69% of respondents being white, 8% black, 13% Hispanic, and 10% mixed or other race. Forty-two percent of youth reported that more than a few friends drank, and 30% reported that ≥ 1 of their parents drank weekly or daily. Table 1 also reports median and interquartile range for continuous variables. In the sample of underage youth, reports

varied widely by individual measure, with 59% of youth reporting seeing advertising on the Web, 13% recognizing 1 of 5 Internet alcohol brand Web sites, 6% having been to an alcohol brand Web site, and 3% reporting being an online fan of an alcohol brand. Overall, although the majority of youth (65%) scored >0 on Internet receptivity, fewer youth (14%) were more highly receptive

(score of 2 = engagement with the Internet across ≥ 2 measures). Some 55% of the 2012 youth in this underage sample reported ever drinking, and 27% reported ever binge drinking. Weighted percentiles are provided in Table 1 and provide population-based estimates, correcting for undersampling of minorities and older adolescents.

TABLE 2 Longitudinal Association Between Internet Alcohol Marketing Receptivity and Drinking Outcomes

Variable	Adjusted Logistic Regression	
	Drinking Initiation (Among Never-Drinkers)	Binge Drinking Initiation (Among Never-Binge-Drinkers)
Internet alcohol marketing receptivity		
Score 0	Reference	Reference
Score 1	1.20 (0.76–1.88)	1.77 (1.13–2.78)*
Score 2	1.13 (0.34–3.76)	2.15 (1.06–4.37)*
Age, y		
15–17	Reference	Reference
18–20	1.57 (0.87–2.86)	1.19 (0.70–2.01)
Gender		
Male	Reference	Reference
Female	0.82 (0.42–1.60)	1.01 (0.60–1.68)
Race or ethnicity		
White	Reference	Reference
Black	0.89 (0.34–2.32)	0.40 (0.15–1.08)
Hispanic	0.40 (0.17–0.92)*	0.89 (0.55–1.47)
Mixed or other	0.78 (0.43–1.42)	0.76 (0.31–1.85)
Sensation seeking (scale)	1.73 (0.81–3.69)	1.71 (1.01–2.90)*
Friend drinking	1.49 (1.04–2.13)*	1.54 (1.16–2.05)*
Parent drinking	1.53 (0.72–3.29)	1.34 (0.81–2.24)
Internet time, h/d	0.94 (0.72–1.22)	1.06 (0.86–1.31)

Analysis limited to respondents with age <21 years and complete data for phone and Web surveys. *Statistically significant odds ratios.

Bivariate Associations With Alcohol Use

Table 1 also shows bivariate associations (weighted percentiles) between sample covariates and Internet alcohol marketing receptivity. Older age ($P = .005$), male gender ($P = .0003$), higher sensation seeking ($P < .0001$), and having friends ($P < .0001$) or parents ($P < .0001$) who drink were significantly associated with higher Internet receptivity, as were greater reported Internet use ($P < .0001$) and both ever drinking ($P < .0001$) and binge drinking ($P < .0001$) at baseline.

Multivariate Associations

Table 2 describes risk factors for drinking and binge-drinking onset between survey waves. Higher sensation seeking predicted binge-drinking onset, and peer alcohol use predicted both drinking and binge-drinking onset. Hispanic race was protective for drinking onset. Older age was not predictive of either drinking or bingeing onset despite the fact that some youth in the 18- to

20-year-old category at baseline transitioned to legal drinking age (21 years) by the time of follow-up. Even after we controlled for these factors, higher receptivity to Internet alcohol marketing was positively associated with transition to binge drinking at follow-up: Compared with nonreceptive youth, those with a receptivity score of 1 were 1.77 times more likely and those with a score of 2 were 2.15 times more likely to report binge drinking at follow-up (OR 1.77; 95% confidence interval [CI], 1.13–2.78 and OR 2.15; 95% CI, 1.06–4.37, respectively). Higher receptivity score was not associated with drinking initiation among baseline nondrinkers.

DISCUSSION

This is the first study to demonstrate a prospective association between involvement with Internet alcohol marketing and future drinking outcomes. Using a composite measure of Internet alcohol marketing receptivity and controlling

for plausible covariates including overall time spent on the Internet, we found that higher involvement with such marketing at baseline was independently associated with binge-drinking onset by follow-up but not with initiation of ever drinking. The study supports theoretical work⁴⁷ predicting that active engagement in alcohol marketing would be associated with later drinking outcomes, such as binge drinking, because this engagement may reflect alcohol-related cognitions, such as seeing oneself as a drinker, that would be expected to appear later in the process of experimentation with alcohol. Present study findings are also consistent with the model's premise that initiation of drinking would be associated with more passive exposures, such as TV advertising, reflecting the development of norms and expectancies, cognitions important in predicting initiation of alcohol use. This work adds to a growing body of literature that supports an association between alcohol advertising exposure across an expanding number of media platforms^{20,31–33,35,37,50} and youth alcohol use.

Given the broad range of alcohol marketing venues and high prevalence of cross-platform marketing campaigns with consistent messaging, it is likely that our measure of Internet alcohol marketing receptivity captures both specific exposures to alcohol marketing messages and communications and receptivity to alcohol marketing more broadly (ie, familiarity with brand-specific communications). It also captures the extent to which a youth has assimilated those messages. Marketing fosters brand capital by repeatedly and consistently associating brands with a set of aspirational characteristics and messages, creating expectancies about what these brands can do for

an individual.^{10,19,22} An important distinction between Internet alcohol marketing and inherently passive exposures, such as television advertising (or even passive exposure to alcohol marketing online), is that the Internet allows greater engagement with marketing. Although our measures of active engagement (becoming a “fan” and both self-reported and cued recall of visits to alcohol brand Web sites) were not highly prevalent in the current study, underage youth who demonstrated such engagement by virtue of reporting positively to multiple measures had a higher likelihood of transitioning to binge drinking. Additional measures of Internet engagement and ambassadorship are warranted to assess access to and involvement with online alcohol marketing, especially across sites that vary in age-gating methods. Furthermore, even though youth with higher Internet use also had a higher likelihood of engaging in online marketing, there was no significant association between Internet activity in general and alcohol outcomes in regression analysis, supporting a specific exposure–behavior link. Thus, content matters.

Although this longitudinal analysis supports the idea that exposure to alcohol marketing precedes drinking transitions, it is possible that this process is not unidirectional and instead reinforces a cycle of exposure and response, as has been shown for the relation between alcohol-branded merchandise ownership and drinking transitions.⁴⁷ Similarly, engagement with electronic alcohol marketing may reflect a

reciprocal process in which a youth seeks out marketing as a result of accumulated past exposures to alcohol marketing and his or her own drinking experiences. More complex modeling with ≥ 3 waves of data and more refined measures of Internet alcohol marketing will be helpful to determine the direction and strength of the associations we report here.

A number of covariates, including sensation seeking and overall Internet use, were included in our analysis; however, it is possible that an unmeasured confounder could explain the associations we found between these marketing exposures and drinking outcomes. Thus, the finding must be replicated with other adolescent samples and with plausible alternative covariates before we can make causal statements about Internet marketing. Exposure to marketing online is self-reported and thus may be subject to recall bias. Youth may misclassify consumer alcohol postings as company-generated alcohol marketing, and this error may have been a particular problem for more general measures (eg, seeing alcohol advertising on the Web). Similarly, assessments that were not cued with images, such as visiting an alcohol company Web site or being an online fan, may lack specificity. Capturing Internet behaviors is uniquely challenging, and more extensive assessments with cued recall methods are needed to elucidate and accurately capture the broad range of potential marketing exposures and to provide a richer and more nuanced understanding of how youth interpret and are influenced by this marketing.

CONCLUSIONS

In this study, Internet alcohol marketing receptivity was associated with underage binge drinking even after we controlled for overall Internet time. As reported previously,^{37,47} more passively acquired exposures, such as through TV watching, may contribute to shaping attitudes toward alcohol among never users; these exposures are common and affect large numbers of adolescents. Accordingly, Internet marketing may be important in transitions to problematic outcomes (eg, binge drinking) in the subset of drinkers who are more highly engaged and seek out online marketing. Given that such marketing is both industry and consumer generated and is broadly accessible, efforts to reduce youth exposure are challenging and will need to target multiple areas, including stricter industry and social media age verification standards, programs aimed at youth media literacy, and efforts to guide parents and physicians in helping youth navigate online marketing messages. Additional assessment and monitoring of Internet alcohol advertising, including social marketing, is critical as the new media landscape evolves, particularly as youth engage with new media at younger ages and on rapidly evolving platforms and devices.

ABBREVIATIONS

CI: confidence interval
OR: odds ratio

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Address correspondence to Auden C. McClure, MD, MPH, Department of Pediatrics, Dartmouth-Hitchcock Medical Center, One Medical Center Drive, Lebanon, NH 03756. E-mail: auden.c.mcclure@hitchcock.org

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