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Alcohol Marketing Receptivity, Marketing-Specific Cognitions, and Underage Binge Drinking

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Background: Exposure to alcohol marketing is prevalent and is associated with both initiation and progression of alcohol use in underage youth. The mechanism of influence is not well understood, however. This study tests a model that proposes alcohol-specific cognitions as mediators of the relation between alcohol marketing and problematic drinking among experimental underage drinkers.

Methods: This study describes a cross-sectional analysis of 1,734 U.S. 15- to 20-year-old underage drinkers, recruited for a national study of media and substance use. Subjects were queried about a number of alcohol marketing variables including TV time, Internet time, favorite alcohol ad, ownership of alcohol-branded merchandise (ABM), and exposure to alcohol brands in movies. The relation between these exposures and current (30-day) binge drinking was assessed, as were proposed mediators of this relation, including marketing-specific cognitions (drinker identity and favorite brand to drink), favorable alcohol expectancies, and alcohol norms. Paths were tested in a structural equation model that controlled for sociodemographics, personality, and peer drinking.

Results: Almost one-third of this sample of ever drinkers had engaged in 30-day binge drinking. Correlations between mediators were all statistically significant (range 0.16 to 0.47), and all were significantly associated with binge drinking. Statistically significant mediation was found for the association between ABM ownership and binge drinking through both drinker identity and having a favorite brand to drink, which also mediated the path between movie brand exposure and binge drinking. Peer drinking and sensation seeking were associated with binge drinking in paths through all mediators.

Conclusions: Associations between alcohol marketing and binge drinking were mediated through marketing-specific cognitions that assess drinker identity and brand allegiance, cognitions that marketers aim to cultivate in the consumer.

Key Words: Adolescent, Young Adult, Alcohol, Advertising, Marketing, Binge Drinking.

ALCOHOL USE IN underage youth is prevalent and associated with serious negative health consequences (Federal Trade Commission, 2008). Alcohol is also heavily marketed; in 2005, 12 companies, representing 73% of sales by volume, reported to the Federal Trade Commission expenditures of just over $3 billion in U.S. advertising and promotions (Federal Trade Commission, 2008). Alcohol companies are bound only by voluntary codes and advertise broadly in many venues accessible to underage youth. Two comprehensive reviews (Anderson, 2009; Smith and Foxcroft, 2009) demonstrated, across 13 longitudinal studies, consistent prospective associations between exposure to alcohol marketing and underage drinking, and findings confirmed in a recent U.K. cohort (Gordon et al., 2010). The individual studies varied widely in their focus and measurement approach and offered mixed results beyond the overall conclusions presented in the reviews. For example, some associations pertained only to certain age or gender subsets (Casswell et al., 2002; Connolly et al., 1994) or applied only to certain types of alcohol (Collins et al., 2007; Ellickson et al., 2005) or drinking outcomes (Henriksen et al., 2008; Robinson et al., 1998). In addition, the reviews combined studies of movie alcohol portrayals with studies of commercial marketing. Studies of alcohol marketing per se varied widely on how the exposure was measured. This is not meant to be a critique of the literature, but to point out the complexity of this particular area of research, reflecting the broad scope of alcohol marketing in the context of the development of drinking behavior and different theoretical approaches to conceptualizing marketing influences.

A number of theoretical models describe how advertising exposure could affect behavior. These are based largely on social cognitive theory (Bandura, 1986) and message interpretation processing models (Austin et al., 2006; Fleming et al., 2004; McGuire, 1985; Unger et al., 2003), which suggest that the way in which individuals interpret and respond to advertising is as important as the exposure itself

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(Casswell and Zhang, 1998; Grube and Wallack, 1994). Austin and colleagues (2006) concluded that exposure measures were weaker predictors of progression to alcohol use than response variables, such as ad identification and liking of beer brands. Such attitudinal responsiveness to advertising is termed marketing receptivity, as operationalized by Pierce and colleagues (1998) for studies of tobacco marketing and adapted for alcohol by Unger and colleagues (2003) and Henriksen and colleagues (2008). In these studies, marketing receptivity was viewed as a series of steps, each representing higher involvement with marketing. "Low receptivity" was characterized by brand recognition and recall (awareness), "moderate receptivity" by endorsing a favorite alcohol ad, and "high receptivity" by owning or wanting to own branded clothing or other merchandise. This theoretical approach suggests that young people are exposed to alcohol marketing, become aware of and receptive to that marketing, and ultimately develop an interactive relationship with the brand. Thus, there is evidence to support the idea that a pure measure of marketing exposure, while important, may be a weaker predictor of behavior than a measure of an affective or cognitive response. Thus, the difference in the way marketing is assessed could explain some of the heterogeneity of results in the alcohol marketing studies cited earlier.

The intent of marketing is to increase demand by prompting the purchase of the product being advertised and to cultivate brand allegiance. This is accomplished by building brand equity, attributing meaning and emotion to the brand through imagery that associates the brand with lifestyles appealing to the target population (Casswell, 2004; Keller, 2008). Although alcohol marketing may not be aimed at underage drinkers, they are, nevertheless, exposed to and affected by it (Anderson, 2009; Chung et al., 2010; Smith and Foxcroft, 2009). Young people are highly susceptible to image appeals because of their preoccupation with personal image and identity (Giles and Maltby, 2004; Kroger, 2007). They constantly question who they are, how they look, and how they are perceived by their peers (Finkenauer et al., 2002) as they develop a concept of self. Adolescence and young adulthood are often characterized by increased admiration of famous persons (Giles and Maltby, 2004). Alcohol marketing to youth focuses heavily on lifestyle elements and involves popular culture role models, elements that resonate with these young consumers (Chen et al., 2005).

The aim of this research is to better understand how alcohol marketing is associated with underage drinking. A causal interpretation for the association would gain plausibility if the relation was mediated by cognitions that marketers aim to instill in the target population, such as the development of drinker identity or alcohol brand allegiance. As young people identify themselves with the attractive features of the social lifestyle portrayed in alcohol commercials (Morgenstern et al., 2011a,b), they might be more likely to adopt favorable attitudes and begin drinking. Chen and colleagues (2005) demonstrated that affective response to ads related to portrayed lifestyle elements and that liking an ad was associated with ad effectiveness as defined by likelihood of buying/wanting to buy the product. In a reciprocal process, as experimental drinkers gain experience with drinking and become more interested in advertising, they may be more likely to identify themselves as being a drinker (Gerrard et al., 1996). Similarly, adoption of a favorite brand could be influenced by exposure to alcohol marketing, as young people incorporate imagery and attributes associated with a certain brand into their own sense of self (Austin et al., 2006; Casswell, 2004; Casswell and Zhang, 1998). We have previously demonstrated that two-thirds of U.S. underage drinkers had a favorite brand to drink and that the preferred brands were those with highest advertising expenditures. In addition, having a favorite brand was associated with substantially higher binge drinking rates compared with youth who did not have a favorite (Tanski et al., 2011). Among experimental drinkers, these marketing-specific cognitions could mediate the pathway between exposure or receptivity to alcohol marketing and heavy alcohol use, but this has not, to our knowledge, been tested.

Social-cognitive theoretical models explaining young people's alcohol use have thus far focused on normative beliefs, prototypes, refusal self-efficacy, and alcohol expectancies (Austin et al., 2006; Brown et al., 1987; Dal Cin et al., 2009; Tickle et al., 2006). Alcohol-related cognitions have been assumed to be one of the most proximal predictors of both initiation and maintenance of alcohol use in youth. Expectancies about the pros and cons of drinking are related to drinking in adolescents (Jones et al., 2001; Wiers et al., 1997) and young adults (Bot et al., 2005; Fleming et al., 2004). Further, perceived peer norms on drinking are related to heavy drinking and problem drinking in late adolescence and young adulthood (Borsari and Carey, 2003; Bot et al., 2007; Labrie et al., 2010). As these are robust, well-established predictors of drinking, it is important to examine marketing-specific cognitions in the context of these predictors. If marketing-specific cognitions mediate the relation between alcohol marketing and binge drinking, above and beyond established alcohol-related cognitions, this would underscore their relevance in alcohol marketing models of behavior.

We offer a heuristic model of alcohol marketing receptivity (Fig. 1) that addresses some of these considerations. We posit marketing receptivity as a continuous process that develops side-by-side with the progression of experimental drinking during the underage period. Beginning with distal advertising exposures, receptivity to marketing progresses to noticing and remembering advertising, then active involvement. We hypothesize that distal measures of advertising exposure will be less strongly associated with behavior than proximal ones. Accordingly, we predict a stronger association between owning alcohol-branded merchandise (ABM) and binge drinking compared with, for example, exposure to

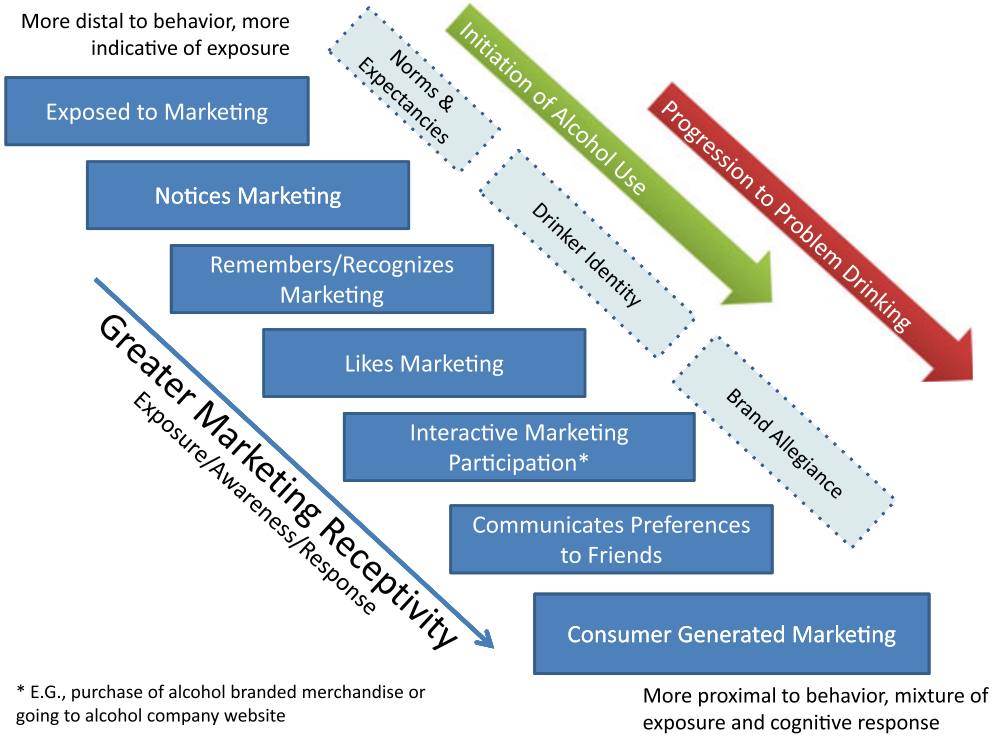

Fig. 1. Heuristic Marketing Receptivity Model.

alcohol brands in movies, based on the assumption that the former reflects an affective response (willingness to wear the logo), not just exposure to the marketing. The model also incorporates marketing-specific cognitions (drinker identity and favorite brand to drink) hypothesized to mediate the association between alcohol marketing and drinking. We assume that marketing-specific cognitions have additional value beyond outcome expectancies and social norms. This study is a first empirical test of this model by assessing measures of alcohol marketing exposure and receptivity in a cross-sectional study of underage drinkers.

MATERIALS AND METHODS

Recruitment

A description of original recruitment methods has been published (Sargent et al., 2005). Briefly, in 2003, 6,522 10- to 14-year-olds were recruited from the United States via random-digit-dialing for a longitudinal study of media and substance use. Because of loss to follow-up, a supplementary sample of 598 African-American youth was added in 2007. Surveys were conducted by Westat, a survey research company. Permission was obtained from participants aged 18 years and older; parental permission and adolescent assent were obtained for those under 18 years of age. To protect confidentiality, adolescents entered responses to sensitive questions using the telephone touch pad. Surveys were approved by the Dartmouth Human Subjects Protection Committee. There was substantial attrition from baseline (65%); participants lost to follow-up were more likely to be minority, older, of lower socioeconomic status (SES), and higher in sensation seeking. This study uses data from the sixth wave of the survey, collected from July to October 2009. Although no longer nationally representative, this cross-sectional sample included 2,718 14- to 21-year-old respondents from all 50 U.S. states, of whom 1,734 ever drinkers, aged 15 to 20 years, are the subject of this analysis (the two 14-year-olds in the study did not report ever drinking).

Measures

Outcome Measure. The primary outcome measure was current binge drinking ("How many times in the *past month* have you had 5 or more drinks of alcohol in a row?"), referred to hereafter as "binge drinking" (Centers for Disease Control and Prevention, 2010).

Exposure Measures—Marketing Receptivity Variables. Two proximal measures that captured a mix of exposure and attitudinal response to advertising were adapted from Pierce's measures of alcohol marketing receptivity (Henriksen et al., 2008; Pierce et al., 1998; Unger et al., 2003) and included having a favorite alcohol ad ("Think about alcohol ads you have seen. Do you have a favorite?") and ABM ownership ("Do you own something with an alcohol brand on it?"). More distal measures assessed only exposure to alcohol advertising and varied in their specificity. Hours of Internet use ("How much time in a typical day do you spend on the internet?") and of TV viewing ("On week days, how many hours a day do you usually watch TV?") were relatively nonspecific for advertising; each of these would reflect exposure only to the extent that they included programs with alcohol portrayals or advertisements. A more specific measure, exposure to movie alcohol brand placements, was estimated using previously validated methods (Dal Cin et al., 2008). In brief, top-grossing box office hits for the 2 years prior to the survey were selected and content coded for alcohol use, intoxication, timed alcohol use, and alcohol brand appearances. A random sample of 50 titles, stratified by Motion Picture Association of America (MPAA) rating, was selected for each participant who was asked whether he/she had seen each movie. Reliability of recall was previously demonstrated (Sargent et al., 2008). An exposure score was created by

dividing alcohol brand appearances seen by each respondent, based on movies seen, by the number of appearances possible in the 50 movies queried.

Mediators. Two variables were hypothesized to mediate advertising-specific pathways: identifying oneself as a drinker ("I see myself as a drinker," "Drinking is part of my personality," and "Drinking is part of who I am" [3 items, Cronbach's $\alpha = 0.84$]) and identifying a favorite alcohol brand ("What is your favorite brand of alcohol to drink?"). Two other cognitive mediators were assessed: positive alcohol expectancies (e.g., "I think drinking alcohol would make me have more fun at parties" [8 items, $\alpha = 0.89$) and alcohol norms ("How many people your age do you think have been drunk at least once?").

Covariates. The multivariate path model included all of the sociodemographic and psychosocial risk factors described below as covariates. Sociodemographics included age, gender, and SES. SES was derived from parent-reported education and household income, as assessed in the 2007 survey (2 items, $\alpha = 0.60$). Parent education was assessed by "What is the highest grade or year of school that you (parent) completed?" (13 categories including grade school, HS, college or Voc/Tech, Associates or Bachelor's Degree, Professional Degree) and household income by "Please tell me which group best describes the total income of all persons living in this household over the past year?" ($\leq$ \$10,000, \$10,000 to \$20,000, \$20,000 to \$30,000, \$30,000 to \$50,000, \$50,000 to \$75,000, $\geq$ \$75,000). We examined other variables associated with binge drinking, including depression (e.g., "During the past 2 weeks, have you ever felt down, depressed, or hopeless?" [2 items, $\alpha = 0.63$]) (Richardson et al., 2010), sensation seeking (e.g., "I like new and exciting experiences…" [6 items, $\alpha = 0.73$]) (Sargent et al., 2010), self-esteem (e.g., "On the whole, I am satisfied with myself" [5 items, $\alpha = 0.82$]) (Sargent et al., 2010), peer alcohol use ("How many of your friends drink alcohol?"), and video game use ("Do you play video games?"). We considered the addition of parenting (for participants under 18 years) and parent drinking as covariates but did not based on previous research with this cohort showing that they had little influence on the transition from experimentation to binge drinking (Stoolmiller et al., 2012). We did, however, conduct sensitivity analyses reported below to verify the previously reported results.

Statistical Analysis

First, we assessed bivariate associations between the above variables and binge drinking using chi-square testing for dichotomous and ordered variables and correlations for scaled variables. We then examined correlations between marketing variables and mediators. For the path model, we used robust, normal, full information maximum likelihood (FIML) estimation (Yuan and Bentler, 2000), even though not all dependent variables were continuous and normally distributed. We chose this approach because the output is richer for mediation pathways using normal FIML methods, while the robust property helps protect against inaccurate *p*-values. The model was fit using M-plus (Muthén and Muthén, 1998–2010) software to determine mediating pathways between the 5 marketing exposure variables, the 4 attitudinal mediators, and binge drinking, net covariates. This mediational model was saturated—all possible paths were included. Thus, overall fit is not an issue, because the illustrated pathways represent paths net of all other possible paths and therefore provide conservative estimates of effects sizes. For the pairwise correlations and the mediation path model, continuous variables were Winsorized to the 5th and 95th percentiles to limit outlier influence (Shete et al., 2004). To simplify interpretation, predictors and mediating variables were scaled from 0 to 1; thus, the estimate reflects the increase in the outcome, given an increase from low to high for each predictor. Of 1,734 participants, 33 (<2%) were dropped completely because of missing covariate data.

RESULTS

Description of Sample and Two-Way Association Between Variables and Binge Drinking

The 1,734 ever drinkers ranged from 15 to 20 years of age (65% were 18 to 20), and 51% were male. Half of respondents reported video game use, half reported depressive symptoms in the past 2 weeks, and 73% reported that many/most friends drank (Table 1).

Participants reported varying levels of involvement with alcohol marketing. Some 33% owned ABM and 18% reported having a favorite alcohol ad. The pool of 226 movies contained 499 alcohol brand appearances, being present in 35.3, 59.1, and 54.9% of PG, PG-13, and R movies, respectively. Median exposure to alcohol brand appearances was 139 (interquartile range 81, 217). Most respondents reported at least 1 hour of Internet and TV time daily (94 and 95%, respectively); 32% reported over 3 hours daily of Internet use and 40% more than 3 hours of TV.

The mediating variables are also described in Table 1 for drinkers under 21 years of age. With respect to drinker identity items, 20% agreed that they saw themselves as a drinker, 11% that drinking is "part of who I am," and 8% that drinking is part of my personality" (data not shown). Some 32% reported a favorite alcohol brand, and 82% of teens believed that most/all of their friends had been drunk (positive norms). Many participants endorsed positive expectancies: 54% agreed/strongly agreed that "alcohol is relaxing," and 49% agreed it "would make me more likely to have sex" (data not shown).

The prevalence of current binge drinking was 32% in this sample of underage drinkers, and 12% had binged 4 or more times in the past month. Binge drinking was more prevalent among older youth and among males. Binge drinking was also associated with peer drinking and moderately correlated with sensation seeking. Several measures of marketing exposure were significantly associated with binge drinking in bivariate analysis including ownership of ABM, having a favorite alcohol ad, higher movie alcohol brand exposure, and greater weekday TV time. All 4 cognitions were also significantly associated with binge drinking in bivariate analysis.

Correlation Matrix

All correlations between the cognitive mediators were statistically significant (Table 2), with the highest correlation being between drinker identity and alcohol expectancies (0.47). Ownership of ABM showed significant correlations with all 4 cognitions, the highest with drinker identity (0.19) and favorite alcohol brand (0.20). Favorite alcohol ad was correlated with alcohol expectancies (0.09) and alcohol

Table 1. Sample Characteristics and Unadjusted Association with Binge Drinking in Previous Month[a]

Exogenous variables	*n* or median[b]	(%) or IQR[b]	Binge drinking (% or correlation[b])	*p*
Age				
15	21	1%	**19%**	**<0.0001**
16	256	15%	**20%**	
17	320	19%	**28%**	
18	416	24%	**33%**	
19	440	25%	**36%**	
20	281	16%	**42%**	
Gender				
Male	882	51%	**39%**	**<0.0001**
Female	852	49%	**25%**	
Socioeconomic status	0.3[b]	−0.5, 0.8[b]	**0.10**[b]	**0.003**
Depression				
None	852	49%	31%	0.46
1 positive	437	25%	32%	
2 positives	445	26%	34%	
Sensation seeking	15[b]	13,17[b]	**0.28**[b]	**0.0001**
Self-esteem	17[b]	16,19[b]	0.03[b]	0.258
Peer drinking				
None	40	2%	**3%**	**<0.0001**
A few	431	25%	**10%**	
More than a few	451	26%	**24%**	
Most	812	47%	**50%**	
Video game time				
No	884	51%	32%	0.610
Yes	850	49%	33%	
Marketing exposure				
Owns alcohol-branded merchandise				
No	1,162	67%	**25%**	**<0.0001**
Yes	571	33%	**46%**	
Favorite alcohol ad				
No	1,418	82%	**30%**	**0.001**
Yes	314	18%	**40%**	
Movie alcohol brand exposure	139	81, 217	**0.08**[b]	**0.001**
Internet time				
No time	108	6%	35%	0.37
Less than 1 hour	347	20%	34%	
1 to 2 hours	727	42%	33%	
3 to 4 hours	345	20%	31%	
More than 4 hours	206	12%	26%	
TV time				
None	92	5%	**34%**	**0.020**
Less than 1 hour	215	12%	**41%**	
1 to 2 hours	735	42%	**33%**	
3 to 4 hours	440	25%	**30%**	
More than 4 hours	251	15%	**27%**	
Cognitions				
Drinker identity	4	3,6	**0.47**[b]	**<0.0001**
Favorite alcohol brand				
No	1,181	68%	**11%**	**<0.0001**
Yes	553	32%	**42%**	
Alcohol expectancies	22	19, 24	**0.36**[b]	**<0.0001**
Alcohol norms (Friends have been drunk)				
None	8	0.5%	**0%**	**<0.0001**
A few	95	6%	**8%**	
Some	220	13%	**16%**	
Most	875	51%	**31%**	
Almost all	536	31%	**45%**	
Outcome				
Last month binge drinking				
None	1,177	68%		
Once	190	11%		
2 to 3 times	172	10%		
4 to 5 times	79	5%		
5 + times	114	7%		

[a]The sample description includes the population of 1,734 ever drinkers included in the analyses.

[b]Indicates a continuous variable; *n*, proportions and chi-square used for categorical variables; median, interquartile range (IQR), and correlation used for continuous variables.

*Bolded values: $p < 0.05$.

norms (0.07), but not with drinker identity or having a favorite brand. Movie alcohol brand exposure was correlated with drinker identity (0.05), having a favorite brand (0.10), and alcohol norms (0.07). Surprisingly, higher TV time was associated with less endorsement of alcohol expectancies (−0.11). Among the marketing exposure variables, the highest correlations were between having a favorite alcohol ad and ABM ownership (0.13) and between TV and Internet time (0.13).

Multivariate Association Between Marketing Exposure, Alcohol Cognitions, and Binge Drinking

Figure 2 illustrates significant pathways from the 5 marketing variables to binge drinking (for ease of interpretation, covariate paths are not depicted; see Table 3 for complete data). There were multiple pathways from ownership of ABM to binge drinking, including a direct and 2 mediated pathways (ABM → drinker identity → binge drinking; ABM → favorite brand → binge drinking). There was a mediated pathway from movie alcohol brand exposure through favorite brand to binge drinking. There was no relation between having a favorite alcohol ad, TV time, or Internet time and binge drinking.

Table 3 shows the multivariate regressions that form the basis for the structural model. The table describes the results for 5 regressions, 1 for binge drinking and 1 for each of the 4 mediators. All regressions include the alcohol marketing variables and covariates. Mediating cognitions are also included in the model that predicts binge drinking. In this model, ownership of ABM was the only marketing receptivity variable with an independent association with binge drinking, indicating a direct pathway. All 4 mediating variables showed an independent association with binge drinking. With respect to mediating variable regressions, ownership of ABM was associated with drinker identity and having a favorite brand, movie alcohol brand exposure was associated with having a favorite brand, and TV time was associated with alcohol expectancies. With respect to covariates, sensation seeking and friend drinking showed strong associations with all dependent variables, and age/gender with almost all. All exogenous covariates were associated with alcohol expectancies.

Finally, to support our approach, which emphasized stage of alcohol use rather than age, we conducted a sensitivity analysis to examine whether key theoretical paths were moderated by age and found that, with 1 exception, they were not. The association between drinker identity and binge drinking was positive and strongly significant ($p < 0.001$) for both age groups but was significantly stronger ($0.01 < p < 0.05$) for older (age 18 to 20, Est. = 1.20, $p < 0.001$) compared with younger teens (age 15 to 17, Est. = 0.74, $p < 0.001$). In a separate sensitivity analysis, we added parenting (for age 15 to 17) and parent drinking to the mediation model. None of the key theoretical direct or indirect paths shown in Figure 2 changed appreciably in magnitude. Although the *p*-value for the association between

Table 2. Correlation Matrix

	Mediators				Marketing variables				
	Drinker identity	Has favorite brand	Alcohol expectancies	Alcohol norms	Owns alcohol-branded merchandise (ABM)	Has favorite alcohol ad	Movie alcohol brand exposure	Internet time	TV time
Drinker identity	**1**								
Has favorite brand	**0.29*** **	**1**							
Alcohol expectancies	**0.47*** **	**0.26*** **	**1**						
Alcohol norms	**0.16*** **	**0.19*** **	**0.21*** **	**1**					
Owns ABM	**0.19*** **	**0.20*** **	**0.13*** **	**0.13*** **	**1**				
Favorite alcohol ad	0.02	0.03	**0.09** **	**0.07*** **	**0.13*** **	**1**			
Movie alcohol brand Exposure	**0.05***	**0.10*** **	0.04	**0.07*** **	**0.09*** **	**0.06***	**1**		
Internet time	0.01	0.02	0.01	−0.02	**−0.07*** **	0.04	−0.001	1	
TV time	−0.02	0.03	**−0.11*** **	−0.02	−0.05	0.03	**0.10*** **	**0.13*** **	1

Bolded values: ***$p < 0.0001$, **$p < 0.001$, *$p < 0.05$.

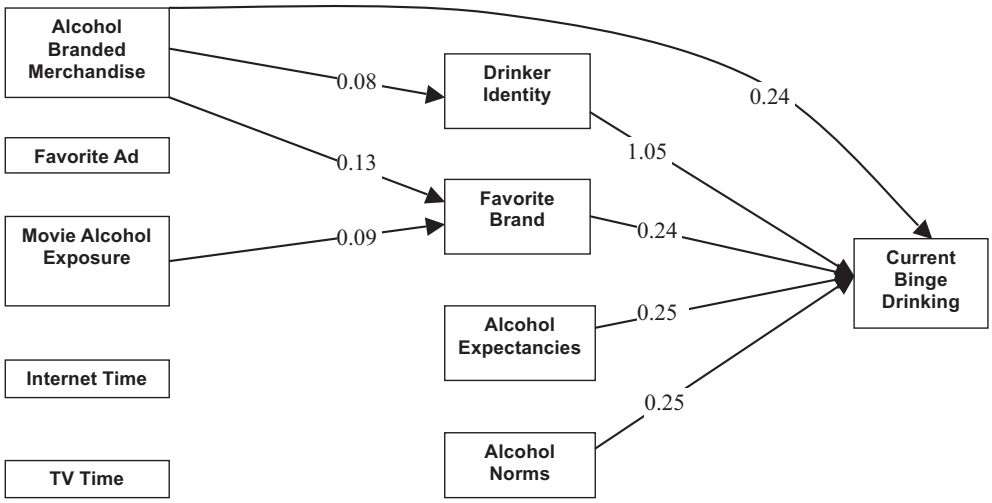

Fig. 2. Mediational Path Model of Alcohol Marketing Receptivity. Numbers are unstandardized path coefficients; all variables scaled so that a 1-point increase represents going from lowest to highest risk (5th to 95th percentile for continuous predictors). All illustrated paths drawn are significant; paths not drawn were estimated but not significant. Pathways for background covariates were also not included in the diagram but can be determined from Table 3.

Internet time and less favorable alcohol norms changed from 0.051 to 0.049 and the *p*-value for the association between higher TV time and favorite brand dropped from 0.059 to 0.043, these 2 indirect paths to binge drinking were not statistically significant.

DISCUSSION

This study provides evidence to suggest a marketing-relevant mechanism that explains the relation between alcohol marketing and heavy drinking. As hypothesized, associations between engagement with marketing and drinking were mediated through marketing-specific cognitions (drinker identity and favorite alcohol brand), rather than through alcohol expectancies and norms, although all 4 cognitions were associated with binge drinking. The mediational analysis provides a rationale for policies to limit exposure to alcohol marketing for underage populations. Confirmation of this mediating process in a longitudinal study would also increase the plausibility of a causal interpretation, as marketing-specific cognitions are endpoints that marketers aim to instill in the target population.

The findings underscore that when testing the role of alcohol marketing in underage drinking from a social-cognitive perspective, it is relevant to assess marketing-specific cognitions as mediators. These cognitions may also be important when studying self-efficacy or drinking motives. Although the alcohol-specific cognitions we assessed in this study (expectancies and norms) are robust, theory-based correlates of alcohol use (Patrick et al., 2010), exclusively focusing on those factors in alcohol marketing research, might underestimate mediating pathways, as we have shown in this study.

The study provides initial evidence to support the heuristic model of advertising receptivity as a continuous process,

Table 3. Unstandardized Path Coefficients Between Marketing Exposures, Mediators, and Binge Drinking

	Dependent variable (multivariate least squared regressions)														
	Primary outcome			Mediators											
	Binged in last month			Drinker identity			Favorite brand			Alcohol norms			Alcohol expectancies		
Predictor	Est.	SE	*p*	Est.	SE	*p*	Est.	SE	*p*	Est.	SE	*p*	Est.	SE	*p*
Exogenous															
Age	−0.02	0.08	0.82	**0.07**	**0.03**	**0.01**	**0.24**	**0.03**	**<0.001**	**0.12**	**0.02**	**<0.001**	**0.04**	**0.02**	**0.02**
Gender (girl)	**−0.19**	**0.06**	**0.001**	**−0.07**	**0.02**	**<0.001**	−0.01	0.02	0.57	**0.03**	**0.01**	**0.04**	**−0.09**	**0.01**	**<0.001**
Socioeconomic status	0.15	0.08	0.08	0.05	0.03	0.07	0.002	0.04	0.95	−0.03	0.02	0.26	**0.15**	**0.02**	**<0.001**
Depression	−0.06	0.06	0.39	−0.04	0.02	0.07	−0.001	0.03	0.96	0.01	0.02	0.66	**0.05**	**0.02**	**0.001**
Sensation seeking	**0.52**	**0.09**	**<0.001**	**0.19**	**0.03**	**<0.001**	**0.14**	**0.04**	**0.001**	**0.13**	**0.02**	**<0.001**	**0.18**	**0.02**	**<0.001**
Self-esteem	**0.35**	**0.10**	**<0.001**	**−0.19**	**0.03**	**<0.001**	−0.06	0.04	0.14	0.01	0.02	0.59	**−0.22**	**0.02**	**<0.001**
Peer drinking	**0.49**	**0.06**	**<0.001**	**0.21**	**0.02**	**<0.001**	**0.25**	**0.03**	**<0.001**	**0.20**	**0.02**	**<0.001**	**0.17**	**0.02**	**<0.001**
Video game time	−0.03	0.06	0.55	**−0.05**	**0.02**	**0.01**	**0.05**	**0.02**	**0.04**	−0.02	0.01	0.08	**−0.03**	**0.01**	**0.01**
Marketing															
Owns alcohol-branded merchandise	**0.24**	**0.06**	**<0.001**	**0.08**	**0.02**	**<0.001**	**0.13**	**0.02**	**<0.001**	0.02	0.01	0.14	0.01	0.01	0.39
Favorite alcohol ad	0.06	0.07	0.39	−0.03	0.02	0.11	−0.04	0.03	0.12	0.02	0.02	0.16	0.02	0.02	0.34
Movie alcohol brand exposure	0.07	0.09	0.40	0.003	0.03	0.90	**0.09**	**0.04**	**0.01**	0.03	0.02	0.15	0.01	0.02	0.81
Internet time	−0.15	0.10	0.12	−0.001	0.03	0.98	−0.01	0.04	0.84	−0.05	0.02	0.051	−0.01	0.02	0.60
TV time	−0.16	0.10	0.11	0.03	0.03	0.34	0.08	0.04	0.06	0.002	0.02	0.93	**−0.07**	**0.02**	**0.01**
Mediators															
Drinker identity	**1.05**	**0.09**	**<0.001**												
Favorite brand	**0.24**	**0.05**	**<0.001**												
Alcohol expectancies	**0.25**	**0.09**	**0.01**												
Alcohol norms	**0.25**	**0.08**	**0.003**												

Bolded values: $p < 0.05$.

whereby the adolescent/young adult goes through cycles of exposure and response in which advertising messages are internalized and incorporated into his or her identity. We suggest the process begins with alcohol advertising exposure and proceeds to awareness, cognitive response, and engagement with interactive marketing, a process that proceeds in a reciprocal fashion along with higher stages of alcohol use. This process is independent of age in the underage drinker group that we studied, but further research, especially in early adolescents, would be needed to confirm this.

As hypothesized by the model, the strength of the association with behavior was stronger for ownership of ABM, a proximal measure that captured both exposure and a positive affective reaction to marketing, compared with more distal, yet specific, exposure measures like movie alcohol brand exposure, which assessed only marketing exposure. From a theoretical standpoint, the stronger correlation between proximal advertising receptivity measures (owning ABM), as opposed to more distal measures, is logical, given that the latter captures only exposure and not the individual's engagement in the marketing process. In addition, among exposure measures, the better-specified movie alcohol brand exposure retained an association with behavior, while a poorly specified one, Internet time, did not.

A policy-relevant issue is whether certain more proximal marketing exposures such as ownership of ABM are a cause of binge drinking or simply a marker for an attitudinally susceptible individual. Our previous longitudinal study used a cross-lagged prospective analysis to demonstrate a reciprocal relationship between attitudinal susceptibility to drinking, ABM ownership, and future drinking (McClure et al., 2006). In that analysis, we found that ownership of ABM was both a risk factor and a marker of an attitudinally susceptible youth, thus implicating the marketing strategy in the development and progression of problem drinking. Such longitudinal research will be pivotal as marketing evolves to be more interactive.

There were findings that we did not expect. Exposure to alcohol brands in movies was more strongly associated with cognitions and behavior than having a favorite alcohol ad. Past studies have shown that liking an ad is associated with an affective response to marketing and a change in behavior (Austin et al., 2006; Casswell, 2004; Casswell and Zhang, 1998; Fleming et al., 2004; Unger et al., 2003), and yet, choosing a favorite ad (a hypothesized marker of marketing receptivity) in this study was associated with none of the mediators, or with binge drinking, net covariates. This could be explained if having a favorite ad mainly taps the entertainment value of the advertisement. For instance, a teen may like a particular Super Bowl ad even if he or she has no particular allegiance to the brand being advertised. In addition, the null finding for TV time and Internet time should be interpreted with caution. Each was a single-item

measure and subject to measurement error. More importantly, the fact that these measures are not associated with mediating cognitions in the full sample should not be taken to mean that TV or Internet alcohol advertising is not important. Both were general measures that included exposure to a broad range of programming as well as commercial alcohol advertising. It is plausible that the specific influence of TV or Internet commercial advertising remains a risk factor. Given the multiple programming and viewing options for TV, more specific measures of the alcohol content embedded in this medium are needed. Cued-based recall measures (Morgenstern et al., 2011a,b) could be a promising method of capturing specific TV and Internet alcohol marketing exposure. Methods for capturing brand placement in TV programming might also prove to be important. Future studies should focus on assessing marketing exposure and receptivity more specifically and study additive effects.

Considering the evolving mix of alcohol marketing, including product placement in movies, print ads, branded merchandise, TV commercials, and marketing on the Internet including interactive games and promotions, future studies are warranted that focus on cumulative rather than individual effects of alcohol marketing. The complexity of alcohol marketing research lies in assessing the full exposure and the affective and cognitive impact that it has on young people (Meier, 2011). As it is impossible to gather complete data on exposure, it is relevant to focus research on articulated themes. First, elucidating how context alters marketing effects is pivotal. For example, how would the impact of seeing a movie with alcohol brand placement in a movie theater with friends differ from watching it alone on TV at home? Second, some marketing exposures might have interaction or additive effects. Showing alcohol ads during commercial breaks in movies containing ample alcohol cues (Engels et al., 2009) might produce different effects than ads interspersed within a sports game or a National Geographic documentary. Third, it is unknown whether marketing influences population subsets differentially, based on age, gender, interests, and brand preference. Although it seems likely, for example, that image-based lifestyle marketing focused on younger age groups (such as an urban party scene) would have a stronger impact on underage drinkers than those targeting older age groups (such as beer ads that emphasize quality of ingredients), this has not been well studied. Hence, we know little about how the fit between brand, type of alcohol, and target group affects drinking (Engels and Koordeman, 2011). Fourth, the impact of alcohol marketing on young people's drinking, especially that which appeals to affective and emotional aspects, could be mediated both through explicit cognitions as we tested in the current study, but also through more implicit, automatic processing (Wiers et al., 2007). This is worthy of further exploration. Finally, there is little research that triangulates on different approaches to study the same question; further insight could be gained by combining epidemiological with experimental–observational designs and experimental research in which the direct, immediate effects of alcohol marketing on behavior (alcohol use) and physiology can be tested stringently. Experimental research could also provide the opportunity to test mediators and moderators in a causal design, and functional magnetic resonance imaging studies may be able to add to biological plausibility of a causal interpretation (Ariely and Berns, 2010).

Limitations

The cross-sectional design of this study limits the ability to show that exposure precedes the development of favorable alcohol cognitions or binge drinking. The sample, while national, was not representative and may be less generalizable to minority groups. Moreover, because the analysis was limited to underage youth, who had already begun to experiment with alcohol, the results do not apply to drinking onset but only to the transition from onset to binge drinking. Drinker identity and having a favorite brand to drink would probably be less relevant to nondrinkers, because some experience with drinking is needed for an individual to access these cognitions. Although we controlled for a number of covariates, it is possible that an unmeasured confounder exists that might further explain the relationship between marketing exposures, mediating cognitions, and drinking behaviors. The finding that age was not a moderator in this group of underage drinkers does not mean that age should not be considered; further studies of this model for young adolescents is indicated. Finally, as discussed, the measures of TV and Internet advertising exposure available for use in this study were relatively nonspecific time-based measures and may not have captured specific marketing exposure. Hence, the lack of an association with drinking should not be taken to mean that such exposures are not important or influential.

CONCLUSIONS

Given the serious negative outcomes associated with binge drinking, and its growing prevalence, this study and the proposed theoretical model represent an important step in understanding the continuum between marketing exposure, receptivity, development of important marketing cognitions such as drinker identity and brand allegiance, and their influence on problematic drinking behaviors. If longitudinal studies confirm that the association between alcohol marketing exposures and binge drinking is mediated through marketing-specific cognitions, this would enhance support for a causal mechanism. Thus, a better understanding of these processes could guide prevention efforts through education and media literacy and support limits on the reach of alcohol marketing in the underage segment.

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