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Receptivity to alcohol marketing predicts initiation of alcohol use

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Abstract

Purpose—This longitudinal study examined the influence of alcohol advertising and promotions on the initiation of alcohol use. A measure of receptivity to alcohol marketing was developed from research about tobacco marketing. Recall and recognition of alcohol brand names were also examined.

Methods—Data were obtained from in-class surveys of 6th, 7th, and 8th graders at baseline and 12-month follow-up. Participants who were classified as never drinkers at baseline (n=1,080) comprised the analysis sample. Logistic regression models examined the association of advertising receptivity at baseline with any alcohol use and current drinking at follow-up, adjusting for multiple risk factors, including peer alcohol use, school performance, risk taking, and demographics.

Results—At baseline, 29% of never drinkers either owned or wanted to use an alcohol branded promotional item (high receptivity), 12% students named the brand of their favorite alcohol ad (moderate receptivity) and 59% were not receptive to alcohol marketing. Approximately 29% of adolescents reported any alcohol use at follow-up; 13% reported drinking at least 1 or 2 days in the past month. Never drinkers who reported high receptivity to alcohol marketing at baseline were 77% more likely to initiate drinking by follow-up than those were not receptive. Smaller increases in the odds of alcohol use at follow-up were associated with better recall and recognition of alcohol brand names at baseline.

Conclusions—Alcohol advertising and promotions are associated with the uptake of drinking. Prevention programs may reduce adolescents' receptivity to alcohol marketing by limiting their exposure to alcohol ads and promotions and by increasing their skepticism about the sponsors' marketing tactics.

Before adolescents finish the eighth grade, 41% have tried alcohol and 20% have drunk to the point of intoxication [1]. Approximately 30% begin drinking alcohol before age 13 and the average age of initiation is declining [2,3]. The early onset of alcohol use is associated with other adolescent problem behaviors, such as poor academic performance [4], violence and criminal activity [5], and unsafe sexual activity [6]. Negative consequences of early drinking persist into adulthood. Compared to adults who began drinking at age 21 or older, adolescents who begin drinking before age 15 are, as adults, significantly more likely to become alcohol dependent, to be involved in alcohol-related motor vehicle accidents, and to be involved in physical fights, or otherwise injured after drinking [7].

According to the Institute of Medicine's report on underage drinking, "the effect of pervasive alcohol advertising and promotional activity on adolescent drinking is one the most highly

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contested issues in the alcohol prevention field” [8]. Adolescent drinkers recognize and recall more alcohol brand names than never drinkers [9], and evidence about the role of advertising exposure in the uptake of drinking is accumulating [10,11]. The current study adapted a measure of receptivity to tobacco marketing to test whether adolescents’ receptivity to alcohol marketing predicts alcohol use. It also compared the predictive utility of this new measure with brand recognition and recall.

Marketing receptivity and smoking initiation

The idea of being receptive to any form of marketing suggests a willingness to be open and responsive to the sponsor’s ideas, impressions, and suggestions. Receptivity to tobacco marketing has been defined as the development of positive affect toward cigarette advertising and promotions [12], and is more prevalent among males than females and among non-Hispanic whites than among other ethnic/racial groups [13]. Compared to adolescents who were minimally receptive, those who named a favorite cigarette ad (moderate receptivity) were 82% more likely to progress toward smoking at 3-year follow-up, and those who owned or were willing to use a cigarette promotional item (high receptivity) were almost three times more likely to progress toward smoking [14].

One reason to adapt a measure of tobacco marketing receptivity to study alcohol marketing is that the tobacco and alcohol industries employ similar marketing strategies. Advertising for alcohol and cigarettes associates these products with similar qualities and traits – sex appeal, rebelliousness, sophistication -- that adolescents admire [15,16]. Branded clothing, accessories, and other promotional items offer opportunities to “try on” the image of a drinker or smoker [17,18]. Event sponsorships also represent alcohol and cigarette brands as part of the entertainment and sporting cultures of adolescence [19,20]. Indeed, marketing strategies for alcohol and cigarettes share at least one common objective – to increase the likelihood of product trial among never users.

Similar processes also govern adolescents’ adoption of smoking and drinking. Advertising and promotions for alcohol and cigarettes communicate to adolescents evidence of the social values of drinking and smoking. These symbolic social influences are important in shaping the uptake of smoking and drinking, whether the behaviors result from premeditated actions intended to acquire certain characteristics (e.g., Theory of Planned Behavior, [21] or from more spontaneous reactions to circumstances that facilitate risk behavior (e.g., Prototype Willingness Model, [22]).

Having a Favorite Alcohol Ad

Positive affect evoked by alcohol advertising influences young people’s expectations and decisions about alcohol use [23]. The more desirable adolescents judge the attributes associated with alcohol consumption to be, the more strongly adolescents identify with advertising and the more persuasive its effects. In cross-sectional studies, adolescent alcohol use is associated with Likert-type measures of ad liking [24], the frequency of enjoying alcohol ads [25], and having a favorite alcohol ad [9]. In a longitudinal study, New Zealand adolescents (age 18) rated how much they liked alcohol ads compared to ads for other products [26]. A composite measure of ad liking and adolescents’ brand loyalty (naming a favorite beer brand) was a better predictor of the quantity of beer they consumed at age 21 than the quantity of beer they consumed at age 18.

Owning and Wanting Alcohol Promotional Items

Wearing hats, clothing, or other personal accessories with an alcohol brand may communicate information about adolescents’ personality, intentions, and behavior [27] and contribute to

perceptions that underage drinking is less harmful and more common than it really is. In our previous research, the 20% of a California sample of 6th–8th graders who owned at least one alcohol promotional item were 1.5 times more likely than other students to report drinking alcohol in the previous month [28]. In other studies, the prevalence of owning at least one alcohol promotional item was 14% in a sample of New England 5th–8th graders [17], and 19% in a sample of South Dakota 6th graders [10], and consistently more common among drinkers than among nondrinkers. Among the South Dakota 6th graders, owning an alcohol promotional item predicted an almost two-fold increase in the odds of drinking beer in 7th grade.

A desire to own alcohol promotional items is also associated with adolescent drinking [29]. Adolescents (ages 12–17) rated how much they wanted to own a t-shirt, deck of playing cards, model plane, and basketball that displayed beer brand names or logos, and whether they would prefer the same items with a brand/logo for soft drink or beer [23]. A preference for beer-branded items was correlated with adolescents' expectations about the positive consequences of drinking and with the frequency of drinking alcohol in the past month.

Given the volume of evidence about receptivity to *tobacco* marketing as a risk factor for *smoking* initiation [12,14,30], the current study hypothesized that receptivity to *alcohol* marketing would predict *drinking* initiation. We also anticipated that affective responses to alcohol marketing (receptivity) would predict greater initiation of alcohol use than cognitive responses to alcohol marketing (recognition and recall).

Method

Data were derived from the Survey of Teen Opinions about Retail Environments (STORE study), a longitudinal survey designed primarily to examine the association of adolescents' exposure to retail tobacco marketing and smoking initiation. The STORE study surveyed all three middle schools and both high schools in Tracy, California (pop. 56,929), a Central Valley city with a similar ethnic/racial composition to the state of California and a higher median household income.

A paper-and-pencil questionnaire was administered in grades 6–8 at baseline (February–April 2003) and in grades 7–9 at follow-up (February–March 2004). Active parental consent and student assent were obtained using a protocol approved by Stanford University's Administrative Panel on Human Subjects. A tear-off page with each participant's name and unique identification number was used to deliver surveys to all students whose parents approved their participation. Study staff read all survey questions aloud while teachers remained at their desks to protect the confidentiality of students' responses.

Sample

Of the eligible students at baseline (n=2,728), 394 did not return consent forms, 114 returned negative consent forms, and 95 were absent during data collection, yielding a participation rate of 78%; the retention rate at follow-up was 72%. From the baseline sample, we identified 1,527 students who had not yet initiated alcohol use (see Figure 1). Of these students, 29% were lost to follow-up, primarily because they moved out of the school district. The analysis sample (n=1,080) is comprised of never drinkers at baseline who were not missing follow-up data regarding alcohol use.

Outcome and Advertising Measures

Three items assessed adolescents' drinking status at baseline and 12-month follow-up. Students reported: (1) whether or not they had ever finished most or all of a can of beer, glass of wine, or other drink with alcohol; (2) how many days in the past 30 they had finished most or all of

a drink with alcohol; (3) how many days in the past 7 they had finished most or all of a drink with alcohol. The primary outcome was initiation of alcohol use, defined as the transition from never to ever drinking. Initiation was coded for adolescents who reported any alcohol use in response to the three items at follow-up. We also examined the transition from never to current drinking, defined as drinking alcohol at least 1–2 days in the past month.

Alcohol marketing receptivity—Two closed-ended questions asked about alcohol branded promotional items: “Have you ever owned an item – like a t-shirt, lighter, matches, hat, or sunglasses with an alcohol brand name on it? Would you want to own or use an item with an alcohol brand name on it?” One open-ended question asked about advertising: “What is the brand name of your favorite alcohol advertisement? This could be an ad for beer or some other form of alcohol.” The items and coding were adapted from measures of tobacco marketing receptivity [12,14]: the highest level of receptivity was assigned to students who owned or wanted to use a promotional item, a moderate level to students who named a favorite brand, and the lowest level to students who neither owned/wanted promotional items nor had a favorite brand. The ordinal measure conformed to a Guttman scale (coefficient of scalability = 0.94).

Brand recall—Students were asked to list all the beer brands they could remember. The open-ended data were coded to count the total number of brands recalled (Min=0, Max=7) and whether students recalled three widely advertised beers -- Budweiser, Heineken, and Miller. Variations of the same brand family (e.g., Bud and Bud Lite) were counted as one brand. Misspellings were counted correct if they spelled the brand name phonetically or contained most of the correct letters in the correct order.

Brand recognition—After all other measures of advertising exposure were assessed, students saw four pictures of alcohol ads or products with the brand name removed. Ads for Heineken and Miller Genuine Draft, and pictures of a Budweiser and Smirnoff Ice bottles were selected because they were representative of in-store advertising for four widely advertised alcohol brands. Students marked a box to indicate whether or not they had seen the advertised product and were asked to write down the advertised brand name. Misspellings were counted as correct unless they identified other brands, such as Heinz (ketchup) instead of Heineken or MJB (coffee) instead of MGD (Miller Genuine Draft). The sum of correct identifications measured brand recognition (Min=0, Max=4, $\alpha=0.62$).

Covariates

Parent and peer alcohol use—One item asked students how many of their four closest friends drink alcohol. The responses were dichotomized to compare students without any friends who drink to those with at least one friend who drinks [31]. Students also reported how often their mother (step-mother or female guardian) and father (step-father or male guardian) drink beer, wine, or another drink with alcohol. However, parental drinking was not correlated with alcohol use at follow-up, so this variable was removed from subsequent analyses.

Perceived prevalence—Using a 10-point scale, students estimated the percent of their same-age peers and percent of high school students who drink alcohol at least once a week. The two items were averaged to measure perceived prevalence ($r=0.68$, $p<.001$).

Peer norms—Using a 4-point scale (1=Definitely not, 4=Definitely yes), students rated their agreement with two statements: “Most of my friends/students at my school think it’s okay to drink alcohol once in a while.” The two items were averaged such that higher numbers indicated more perceived approval for drinking ($r = 0.52$, $p<.001$).

Additional confounders were assessed at baseline using previously validated instruments [32]: a 3-item measure of risk taking [33] ($\alpha = 0.81$), unsupervised hours after school, and self-reported grades.

Analyses

Chi-square, *t* tests and *F* tests were used for the analysis of attrition effects, and to examine associations of alcohol marketing receptivity with other baseline characteristics. Odds ratios and 95% confidence intervals were computed to test whether advertising recall, recognition, and receptivity predicted any drinking and current drinking at follow-up, adjusting for social influences to drink (peer drinking, perceived prevalence, perceived approval), psychosocial risk factors (risk taking, after school supervision, self-reported grades) and demographics (gender, grade level, and ethnicity). Ethnicity was dummy coded to compare non-Hispanic white with Hispanic/Latino (any ethnic identification that included Hispanic), and other or multiple ethnicities. A median split of self-reported grade compared students who earned mostly As and Bs with students who earned lower grades. All other covariates were coded so that higher scores indicated purported greater risk and were standardized. Results from an ordinal logistic regression to predict alcohol use (abstinent, initiated but not current, current drinker) did not differ from the separate models to predict initiation versus abstinent and current drinking versus abstinent. Because participants were surveyed at multiple schools, we also tested the potential effect of school clustering with multilevel modeling using GLIMMIX for SAS version 8.0. However, results of the multilevel model did not differ from results of pooled multiple logistic regressions. All analyses used SPSS version 14.0.

Results

The study sample ($n=1,080$) was comprised of slightly more girls (57.3%) than boys and they ranged in age from 10 to 15 years. The sample was 28% non-Hispanic white, 39% Hispanic/Latino, and 33% other or unknown.

Attrition Analysis

Never drinkers with and without follow-up data were compared on all baseline variables. As shown in Table 1, students lost to follow-up were more likely than others to be younger, to be boys, and to report lower grades in school. The group lost to follow-up was more receptive to alcohol marketing than the study participants, but the groups did not differ in terms of brand recall and recognition. The differential attrition associated with exposure to best friends who drink and propensity for risk taking indicated that students lost to follow-up could have been more at risk for alcohol initiation than other students.

Brand Recognition and Recall

At baseline, nearly all never drinkers (95%) recalled at least one beer brand. Budweiser was the brand recalled by the most students (89%). Knowledge about alcohol brands did not always include the correct spelling. For example, coders awarded credit to approximately 20 misspellings of Budweiser and 60 misspellings of Heineken.

Most never drinkers (74%) recognized at least one alcohol brand out of four ads in which the brand name was obscured. Budweiser was recognized by 55% of never drinkers, Heineken by 42%, Miller Genuine Draft and Smirnoff Ice by 28% each. More students recalled than recognized Budweiser, perhaps because the image of the bottle was less familiar to students than other images of the same brand might have been (e.g., the can, Clydesdales or Budweiser crown).

Alcohol Marketing Receptivity

At baseline, 12% of never drinkers nominated a favorite alcohol ad. Budweiser was mentioned by the most students. Approximately 21% of never drinkers owned at least one alcohol promotional item and 19% wanted such an item. The 41% of never drinkers who were at least moderately receptive to alcohol marketing were more likely than other students to be male, older, have a best friend that drinks, and to report lower grades (see Table 2). Alcohol marketing receptivity was also associated with better brand recognition and recall and with risk taking, unsupervised hours, perceived prevalence, and peer approval.

Predictors of Any Alcohol Use

Approximately 29% of adolescents who were never drinkers at baseline had initiated alcohol use at follow-up. The incidence of any alcohol use among the minimal, moderate, and high receptivity groups was 22%, 31%, and 44%, respectively. Brand recognition and recall were also correlated with initiation, as shown in Table 3. These associations persisted after adjusting for demographics, social influences to drink, and other psychosocial risk factors (see adjusted odds ratios in Table 3). Compared to students who reported minimal receptivity to alcohol marketing, the odds of initiation increased 77% for students who reported high receptivity. However, the difference between moderate and minimal receptivity was not significant. The odds of initiation at follow-up increased by 15% for each alcohol brand students recognized at baseline, and by 16% for each brand they recalled.

When brand recognition, recall, and alcohol marketing receptivity were included in a single model with the other covariates, neither recall nor recognition retained significance (see Table 3). Other significant predictors of initiation were being in 7th or 8th grade at baseline, exposure to peer drinking, lower self-reported grades, and a higher propensity for risk taking (data not shown). Neither gender, ethnicity, normative perceptions, nor unsupervised hours retained significance in a multivariate model to predict any drinking.

Predictors of Current Drinking

Approximately 13% of adolescents who were never drinkers at baseline reported drinking at least 1–2 days in the past month. The incidence of current drinking among the minimal, moderate, and high receptivity groups was 9%, 15%, and 20%, respectively. Adjusting for demographics, social influences to drink and other psychosocial risk factors, students who reported minimal receptivity to alcohol marketing, those who reported high receptivity were 75% more likely to report current drinking at follow-up. Current drinking was also associated with better brand recognition and recall, as shown in Table 3. The odds of current drinking increased 34% with each alcohol brand students recognized at baseline; 36% with each brand they recalled. When brand recognition, recall, and alcohol marketing receptivity were included in a single model with all other covariates, neither recall nor recognition retained significance (see Table 3). Other significant predictors of current drinking were identical to those for any drinking with the exception of gender – boys were more likely than girls to report current drinking at follow-up (data not shown).

Discussion

Alcohol advertising was familiar and likable to middle school students who had never consumed an alcoholic beverage. Nearly all of a sample of never drinkers recalled at least one beer brand, and a majority of them recognized at least one brand name from four ads in which the brand name was obscured. Nearly half of the sample was receptive to alcohol marketing, as indicated by their positive affect toward alcohol advertising or promotional items.

All three advertising measures -- brand recognition, brand recall, and receptivity to alcohol marketing-- predicted increases in the odds of any drinking and current drinking at follow-up, after adjusting for multiple risk factors. When receptivity to alcohol marketing was controlled, recall and recognition did not predict adolescent alcohol use. This finding is consistent with other studies in which affective responses toward alcohol advertising were better predictors of adolescent drinking than other implicit measures of advertising exposure.

Because of the penetration of alcohol advertising in the youth market [34] and accumulating evidence that exposure predicts alcohol use, all forms of alcohol advertising and promotion warrant careful monitoring. Although the Federal Trade Commission (FTC) requires the largest U.S. tobacco companies to report annual marketing expenditures, no such accounting is required of the alcohol industry. Based on the findings from this study and others [10,11,17], the FTC (or some other agency) should compel the largest brewers, vintners and producers of distilled spirits to report annual expenditures on all forms of alcohol advertising and promotion. In particular, more detailed information is needed about the production and distribution of alcohol promotional items. Owning or wanting such items (high receptivity) exhibited the strongest association with adolescent drinking. This finding is consistent with the research on tobacco marketing receptivity, which formed the evidence base for banning cigarette promotional items in the U.S. [35]. Clearly, a similar policy regarding alcohol promotional items would benefit adolescent health.

A primary limitation of the current study was the loss to follow-up, which is typical for school-based research about adolescent substance use. Although the group lost to follow-up was probably at greater risk for initiating alcohol use, the nature of attrition makes for a more conservative test of hypotheses. Thus, our findings may underestimate the influence of receptivity to alcohol marketing on adolescent drinking.

Other limitations of the current study underscore multiple needs for future research. This study was not designed to explain the underlying mechanism whereby adolescents' receptivity to alcohol marketing promotes drinking. Advertising theory suggests that positive affect toward alcohol marketing (generally) and alcohol brands (specifically) may derive from repeated exposure [36] and from interactions of message features with individual characteristics [37]. Examining mediators and moderators of marketing receptivity on alcohol use would also contribute to a more detailed explanation of how advertising and promotions influence adolescents' health behaviors. For example, receptivity to tobacco marketing mediated the effects of psychological factors such as novelty seeking on adolescent smoking [38], and this process may be similar for adolescent drinking.

Because the study sample was relatively young (ages 10–15), our data yielded too little variation to examine drinking frequency, and quantity data were not obtained. Research is needed to examine the role of alcohol advertising in determining the quantity and frequency with which adolescents drink, and in the development of binge drinking.

This study lends credence to the argument that alcohol advertising and promotions are a cause of underage drinking. Policies and prevention programs should aim to limit adolescents' exposure to alcohol marketing, including alcohol promotional items. Increasing adolescents' knowledge about the alcohol industry's marketing tactics is also recommended. For example, anti-smoking campaigns that criticize the tobacco industry and its marketing have been successful in altering social norms about tobacco use and in reducing adolescent smoking [39]. This strategy should be adapted to alcohol use prevention. Media literacy education, which aims to increase consumers' critical appraisal of media in general and advertising in particular, is also recommended to mitigate advertising influences on adolescent substance use [40]. In order to reduce adolescents' receptivity to alcohol marketing, media literacy curricula

should be expanded to address branded promotional items in addition to other forms of advertising.

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References

1. Johnston, L.; O'Malley, P.; Bachman, J.; Schulenberg, J. Secondary school students (NIH Publication No. 06-5883). I. Bethesda, MD: National Institute on Drug Abuse; 2006. Monitoring the Future national survey results on drug use, 1975–2005.
2. Grunbaum JA, Kann L, Kinchen S, Ross J, Hawkins J, Lowry R, et al. Youth risk behavior surveillance--United States, 2003. *MMWR Surveill Summ* 2004 May 21;53(2):1–96. [PubMed: 15152182]
3. Substance Abuse and Mental Health Services Administration. Alcohol Use: The National Household Survey on Drug Abuse. 2003.
4. Ellickson PL, Tucker JS, Klein DJ. Ten-year prospective study of public health problems associated with early drinking. *Pediatrics* 2003 May;111(5):949–55. [PubMed: 12728070]
5. White HR, Loeber R, Stouthamer-Loeber M, Farrington DP. Developmental associations between substance use and violence. *Dev Psychopathol* 1999 Fall;11(4):785–803. [PubMed: 10624726]
6. Flisher AJ, Chalton DO. Adolescent contraceptive non-use and covariation among risk behaviors. *J Adolesc Health* 2001 Mar;28(3):235–41. [PubMed: 11226847]
7. Hingson R. Sex differences in adolescent exposure to alcohol advertising in magazines. *Arch Pediatr Adolesc Med* 2004 Jul;158(7):702–4. [PubMed: 15237072]
8. National Research Council and Institute of Medicine. Reducing underage drinking: A collective responsibility. Committee on Developing a Strategy to Reduce and Prevent Underage Drinking. In: Bonnie, Richard J.; O'Connell, Mary Ellen, editors. Board on Children, Youth, and Families, Division of Behavioral and Social Sciences and Education. Washington, D.C.: The National Academies Press; 2003. Report No.: 0-309-08965-4
9. Unger JB, Schuster D, Zogg J, Dent CW, Stacy AW. Alcohol advertising exposure and adolescent alcohol use: A comparison of exposure measures. *Addiction Research and Theory* 2003 Jun;11(3):177–93.
10. Collins RL, Ellickson PL, McCaffrey D, Hambarsoomians K. Early adolescent exposure to alcohol advertising and its relationship to underage drinking. *J Adolesc Health* 2007 Jun;40(6):527–34. [PubMed: 17531759]
11. Snyder LB, Milici FF, Slater M, Sun H, Strizhakova Y. Effects of alcohol advertising exposure on drinking among youth. *Arch Pediatr Adolesc Med* 2006 Jan;160(1):18–24. [PubMed: 16389206]
12. Choi WS, Ahluwalia JS, Harris KJ, Okuyemi K. Progression to established smoking: The influence of tobacco marketing. *American Journal of Preventive Medicine* 2002;22(4):228–33. [PubMed: 11988378]
13. Gilpin EA, Pierce JP, Rosbrook B. Are adolescents receptive to current sales promotion practices of the tobacco industry? *Prev Med* 1997 Jan–Feb;26(1):14–21. [PubMed: 9010893]
14. Pierce JP, Choi WS, Gilpin EA, Farkas AJ, Berry CC. Tobacco industry promotion of cigarettes and adolescent smoking. *Journal of the American Medical Association* 1998;279(7):511–5. [PubMed: 9480360]
15. Shadel WG, Niaura R, Abrams DB. Adolescents' reactions to the imagery displayed in smoking and antismoking advertisements. *Psychol Addict Behav* 2002 Jun;16(2):173–6. [PubMed: 12079259]
16. Jackson MC, Hastings G, Wheeler C, Eadie D, Mackintosh AM. Marketing alcohol to young people: implications for industry regulation and research policy. *Addiction* 2000 Dec;95(Suppl 4):S597–608. [PubMed: 11218354]
17. McClure AC, Dal Cin S, Gibson J, Sargent JD. Ownership of alcohol-branded merchandise and initiation of teen drinking. *Am J Prev Med* 2006 Apr;30(4):277–83. [PubMed: 16530613]

18. Feighery EC, Borzekowski D, Schooler C, Flora J. Seeing, wanting, owning: The relationship between youth receptivity to tobacco marketing and smoking susceptibility. *Tobacco Control* 1998;7(2):123–8. [PubMed: 9789929]
19. Casswell S. Alcohol brands in young peoples' everyday lives: new developments in marketing. *Alcohol Alcohol* 2004 Nov-Dec;39(6):471–6. [PubMed: 15456692]
20. Rosenberg NJ, Siegel M. Use of corporate sponsorship as a tobacco marketing tool: A review of tobacco industry sponsorship in the USA, 1995–99. *Tob Control* 2001 Sep;10(3):239–46. [PubMed: 11544388]
21. Ajzen I. The theory of planned behaviour. *Organizational Behavior and Human Decision Processes* 1991;50:179–211.
22. Gibbons FX, Gerrard M, Blanton H, Russell DW. Reasoned action and social reaction: willingness and intention as independent predictors of health risk. *J Pers Soc Psychol* 1998 May;74(5):1164–80. [PubMed: 9599437]
23. Austin EW, Chen MJ, Grube JW. How does alcohol advertising influence underage drinking? The role of desirability, identification and skepticism. *Journal of Adolescent Health* 2006 Apr;38(4):376–84. [PubMed: 16549298]
24. Unger JB, Johnson CA, Rohrbach LA. Recognition and liking of tobacco and alcohol advertisements among adolescents: Relationships with susceptibility to substance use. *Preventive Medicine* 1995;24(5):461–6. [PubMed: 8524720]
25. Fleming K, Thorson E, Atkin CK. Alcohol advertising exposure and perceptions: Links with alcohol expectancies and intentions to drink or drinking in underaged youth and young adults. *Journal of Health Communication* 2004 Jan–Feb;9(1):3–29. [PubMed: 14761831]
26. Casswell S, Zhang JF. Impact of liking for advertising and brand allegiance on drinking and alcohol-related aggression: A longitudinal study. *Addiction* 1998;93(8):1209–17. [PubMed: 9813902]
27. Workman JE. Alcohol promotional clothing items and alcohol use by underage consumers. *Family and Consumer Sciences Research Journal* 2003;31(3):331–54.
28. Hurtz SQ, Henriksen L, Wang Y, Feighery EC, Fortmann SP. The relationship between exposure to retail alcohol advertising, owning alcohol promotional items, and adolescent alcohol use. *Alcohol & Alcoholism* 2007;42(2):143–9. [PubMed: 17218364]
29. Austin EW, Knaus C. Predicting the potential for risky behavior among those "too young" to drink as the result of appealing advertising. *Journal of Health Communication* 2000;5(1):13–27. [PubMed: 10848029]
30. Sargent JD, Dalton M, Beach M, Bernhardt A, Heatherton T, Stevens M. Effect of cigarette promotions on smoking uptake among adolescents. *Preventive Medicine* 2000;30(4):320–7. [PubMed: 10731461]
31. Jackson C, Henriksen L, Dickinson D, Levine DW. The early use of alcohol and tobacco: Its relation to children's competence and parents' behavior. *Am J Public Health* 1997 Mar;87(3):359–64. [PubMed: 9096534]
32. Henriksen L, Feighery EC, Wang Y, Fortmann SP. Association of retail tobacco marketing with adolescent smoking. *American Journal of Public Health* 2004 Dec;94(12):2081–3. [PubMed: 15569957]
33. Flay BR, Hu FG, Richardson J. Psychosocial predictors of different stages of smoking among high school students. *Preventive Medicine* 1998;27(5 pt 3):A9–A18. [PubMed: 9808813]
34. Ringel JS, Collins RL, Ellickson PL. Time trends and demographic differences in youth exposure to alcohol advertising on television. *J Adolesc Health* 2006 Oct;39(4):473–80. [PubMed: 16982380]
35. Pierce JP, Gilpin EA. How did the Master Settlement Agreement change tobacco industry expenditures for cigarette advertising and promotions? *Health Promot Pract* 2004 July 1;5(3 Suppl): 84S–90S. [PubMed: 15231101]
36. Batra R, Ray ML. Affective responses mediating acceptance of advertising. *Journal of Consumer Research* 1986;13:234–49.
37. Chen MJ, Grube JW, Bersamin M, Waiters E, Keefe DB. Alcohol advertising: what makes it attractive to youth? *J Health Commun* 2005 Sep;10(6):553–65. [PubMed: 16203633]

38. Audrain-McGovern J, Rodriguez D, Patel V, Faith MS, Rodgers K, Cuevas J. How do psychological factors influence adolescent smoking progression? The evidence for indirect effects through tobacco advertising receptivity. *Pediatrics* 2006 Apr;117(4):1216–25. [PubMed: 16585318]
39. Farrelly MC, Niederdeppe J, Yarsevich J. Youth tobacco prevention mass media campaigns: Past, present, and future directions. *Tobacco Control* 2003 Jun;12(Suppl 1):I35–I47. [PubMed: 12773784]
40. American Academy of Pediatrics. Children, Adolescents, and Advertising. *Pediatrics* 2006;118(6): 2563–9. [PubMed: 17142547]

Figure 1.
Sample Retention

Table 1Baseline sample characteristics by follow-up status: 1,527 6th–8th graders (Tracy, CA)

Characteristics at baseline	Analysis Sample (n=1,080)	Lost to Follow-up (n=438)	p-value
Demographics			
Grade level			
6 th	37.7%	43.8%	
7 th	31.8%	26.5%	
8 th	30.6%	29.7%	.05
Gender			
Female	57.3%	45.3%	
Male	42.7%	54.7%	<.001
Ethnicity			
Non-Hispanic white	27.5%	29.0%	
Hispanic	39.4%	41.3%	
Other or multiple ethnicities	33.1%	29.7%	0.44
Social influences to drink			
At least one best friend drinks	23.2%	28.1%	0.04
Perceived prevalence (1–10)	4.0 (2.1)	4.0 (2.2)	0.68
Perceived approval (0–4)	1.8 (0.7)	1.8 (0.7)	0.88
Psychosocial risk factors			
Self-reported grades			
Mostly As and Bs	61.1%	46.5%	
Mostly Bs or lower	38.9%	53.5%	<.001
Unsupervised after school (hrs/day)	1.5 (1.6)	1.6 (1.7)	0.30
Risk taking (1–5)	2.1 (0.9)	2.3 (1.0)	.001
Advertising exposure			
Brand recognition (0–4)	1.5 (1.3)	1.4 (1.3)	0.35
Brand recall (0–7)	2.5 (1.5)	2.5 (1.5)	0.55
Alcohol marketing receptivity			
Minimal	59.4%	48.6	
Moderate (have favorite ad)	12.1%	15.1	
High (own or want promo item)	28.5%	36.3	.001

Table 2

Association of alcohol marketing receptivity with other baseline characteristics (n=1,080)

Association of alcohol marketing receptivity with other baseline characteristics (n=1,666)				
Characteristics at baseline	Alcohol marketing receptivity			p-value
	Minimal (n=641)	Moderate (n= 131)	High (n= 308)	
Demographics				
Grade level				
6 th	67.1	10.8	22.1	
7 th	60.3	10.8	28.9	
8 th	48.8	15.2	36.1	<.001
Gender				
Female	66.0	11.0	23.0	
Male	50.3	13.7	36.0	<.001
Ethnicity				
Non-Hispanic white	55.9	15.5	28.6	
Hispanic	57.7	10.3	31.9	
Other or multiple ethnicities	64.1	11.5	24.4	0.04
Social influences to drink				
Peer drinking				
No best friend drinks	64.8	11.7	23.5	
At least one best friend drinks	41.2	13.6	45.2	<.001
Perceived prevalence (1–10)	3.7 (2.0)	4.2 (2.3)	4.5 (2.2)	<.001
Perceived approval (1–4)	1.6 (0.6)	1.8 (0.6)	2.1 (0.7)	<.001
Psychosocial risk factors				
Self-reported grades				
Mostly As and Bs	62.9	13.2	23.9	<.001
Mostly Bs or lower	53.3	10.5	36.1	<.001
Unsupervised after school (hrs/day) (0–5)	1.3 (1.6)	1.6 (1.0)	1.8 (1.6)	.001
Risk taking (1–5)	1.9(0.8)	2.2 (0.9)	2.5 (0.9)	<.001
Advertising exposure				
Brand recognition (0–4)	1.3 (1.2)	2.1 (1.3)	1.8 (1.3)	<.001
Brand recall (0–7)	2.2 (1.3)	3.1 (1.5)	3.0 (1.6)	<.001

Note. Cell entries are row percent or mean (standard deviation); p-values were obtained from chi-square or F tests.

Table 3

Associations of advertising measures with alcohol use at 12-month follow-up

Baseline characteristics	Any Initiation vs. Abstinent (n=1,080)			Current Drinking vs. Abstinent (n=903)		
	Unadjusted OR (CI)	Adjusted OR (CI) Separate models adjusted for all covariates ^a	Adjusted OR (CI) One model adjusted for all covariates ^b	Unadjusted OR (CI)	Adjusted OR (CI) Separate models adjusted for all covariates ^a	Adjusted OR (CI) One model adjusted for all covariates ^b
Brand recognition (0-4)	1.38 (1.21-1.57)	1.15 (1.02-1.29)	1.07 (0.93-1.23)	1.34 (1.16, 1.54)	1.22 (1.03-1.44)	1.13 (0.93-1.38)
Brand recall (0-7)	1.46 (1.28-1.67)	1.16 (1.05-1.29)	1.10 (0.97-1.25)	1.36 (1.20, 1.53)	1.20 (1.04-1.39)	1.11 (0.94-1.33)
Receptivity						
Minimal	Ref	Ref	Ref		Ref	Ref
Moderate	1.66 (1.10-2.51)	1.34 (0.85-2.10)	1.20 (0.75-1.90)	1.90 (1.08, 3.34)	1.37 (0.73-2.58)	1.19 (0.62-2.26)
High	2.84 (2.12-3.81)	1.77 (1.27-2.48)	1.68 (1.20-2.35)	3.22 (2.16, 4.81)	1.75 (1.10-2.78)	1.62 (1.01-2.60)

^a Odds ratios and 95% confidence intervals from four separate models adjusted for demographics, social influences, and psychosocial risk factors listed in Table 2.

^b Odds ratios and 95% confidence interval from one model adjusted for all covariates in Table 2 and for other advertising measures.