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Watching and drinking: Expectancies, prototypes, and peer affiliations mediate the effect of exposure to alcohol use in movies on adolescent drinking

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Abstract

Objective—To investigate the psychological processes that underlie the relation between exposure to alcohol use in media with adolescent alcohol use.

Design—Structural equation modeling analysis of data from four waves of a longitudinal, nationally-representative, random-digit dial telephone survey of adolescents in the United States.

Main Outcome Measures—Adolescent alcohol consumption and willingness to use alcohol. Tested mediators were alcohol-related norms, prototypes, expectancies, and friends' use.

Results—Alcohol prototypes, expectancies, willingness, and friends' use of alcohol (but not perceived prevalence of alcohol use among peers) were significant mediators of the relation between movie alcohol exposure and alcohol consumption, even after controlling for

¹A more detailed account of alcohol content in these movies and the amount of exposure to this content among youth in this sample can be found in Dal Cin et al. (in press).

³Following the suggestion of MacKinnon and colleagues (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002; MacKinnon, Lockwood, & Williams, 2004), we estimated the significance of the indirect effect with the product of coefficients approach, using bias-corrected bootstrap methods to estimate standard errors and asymptotic confidence intervals around the point estimates of the product terms.

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demographic, child, and family factors associated with both movie exposure and alcohol consumption.

Conclusion—Established psychological and interpersonal predictors of alcohol use mediate the effects of exposure to alcohol use in movies on adolescent alcohol consumption. The findings suggest that exposure movie portrayals may operate through similar processes as other social influences, highlighting the importance of considering these exposures in research on adolescent risk behavior.

Keywords

alcohol drinking patterns; social influences; alcohol attitudes; adolescent development; films

In a scene from the film *Summer Catch* (Tollin, 2001), a young baseball player is seen lying in his sleeping bag, straddled by a young woman in a short skirt who pours beer into his mouth from a bottle held between her knees (this despite a “vow to swear off women and beer” for the season). Movies allow us to experience novel situations; the messages about people, sex, and alcohol conveyed in this movie scene may be ones that some adolescents do not encounter in their real lives. It is widely assumed that such exposure is consequential (e.g., movie ratings systems are designed to assist parents in determining a movie's appropriateness for their children). The accuracy of this assumption is perhaps best demonstrated by decades of research on the short- and long-term effects of exposure to media violence on aggressive behavior (for reviews see Anderson & Bushman, 2002; Huesmann, Moise-Titus, Podolski, & Eron, 2003).

Movie Alcohol Depictions and Alcohol Use

Survey research demonstrates a dose-response relation between exposure to movie alcohol depictions and alcohol use, controlling for possible confounding variables (Hanewinkel, Tanski, & Sargent, 2007; Sargent, Wills, Stoolmiller, Gibson, & Gibbons, 2006), but the processes by which this association occurs have not been thoroughly studied. In this paper we test whether cognitions previously identified as risks for alcohol use mediate the relation between exposure to depictions of movie alcohol use and young people's alcohol consumption.

Content analyses of Hollywood films reveal a) a high prevalence of alcohol use in movies (approximately 80-95% of films depict use), and b) that most movie drinkers are portrayed positively, with negative consequences of alcohol use portrayed infrequently. This indicates that watching movies will expose viewers to scenes where actors' use of alcohol is reinforced (e.g., Everett, Schnuth, & Tribble, 1998; McIntosh, Smith, Bazzini, & Mills, 1999; Stern, 2005). Media personalities can serve as “super peers” (Brown, Halpern, & L'Engle, 2005) for young people, providing models and information about alcohol use that may not be available in the peer group or family. In addition, repeated association of alcohol use with appealing movie characters may lead to increased favorability of the image of drinkers, while the relative lack of association with negative consequences may increase the favorability of expectancies about alcohol use. Social cognitive (Bandura, 1986) and social learning (Akers, 1998) theories focus on role models as sources for observational learning, noting that media is a feature of the social-cultural environment that may serve as a large-scale influence on cognitions and decisions preceding behavior (see also Flay & Petraitis, 1994). Young people may use movie portrayals of alcohol use as a source of information regarding the role of alcohol in social life; if these portrayals are desirable, it is not unreasonable to suggest adoption and imitation of the behavior. Alcohol use in adolescence is linked to adverse health and social outcomes, including later alcohol and drug dependence, violence, suicide, and injuries (e.g., Ellickson, Tucker, & Klein, 2003; Hingson,

Heeren, Zakocs, Kopstein, & Wechsler, 2002; National Highway Traffic Safety Administration, 2006). Understanding mediational pathways between preventable exposure, alcohol use, and adverse outcomes is critical for creating successful health-promotion interventions.

Movie alcohol depictions and alcohol-related cognitions

We examined three alcohol-related cognitions as competing mediators—normative beliefs, alcohol prototypes, and alcohol expectancies. Young people are sensitive to conformity pressures implied by normative information (Bronfenbrenner, 1970); the more prevalent a behavior is believed to be, the more likely they will be to engage in it. Among adolescents, perceiving a higher (vs. lower) prevalence of heavy alcohol use among fellow students is associated with increased intention to start using alcohol and increased alcohol consumption (e.g., Gibbons, Helweg-Larsen, & Gerrard, 1995; Olds, Thombs, & Tomasek, 2005). Prevalent alcohol use in movies may increase the salience or accessibility of alcohol use images and models, biasing young people's perceptions of the extent of alcohol use in the real world. In developing social identities, young people consider various groups to which they might like to belong (e.g., “jocks”) and the desirability of characteristics of a typical group member. Young people expect that by joining a particular group, others will see them as having positive and negative characteristics of the group prototype. For example, a young person who joins the “goth” group may anticipate being seen by others as artistic and scary. Thoughts about the typical person who uses alcohol are known as a drinker prototype (Gibbons & Gerrard, 1995). Longitudinal research shows that more favorable drinker prototypes predict increased willingness to use alcohol and subsequent alcohol use (Gerrard et al., 2002). Attractive characters may be appealing for young people, and their use of alcohol may increase the positivity of the drinker prototype. For example, in *Summer Catch* (Tollin, 2001), the characters using alcohol include popular, athletic, attractive young adults, implying that drinking is part of this desirable image.

Along with norms and prototypes about alcohol use, young people develop expectancies about the consequences of alcohol use. Reciprocal relations between expectancies and use have been shown, but results suggest stronger effects from expectancies to use than the reverse; favorable expectancies about the consequences of using alcohol lead to increased alcohol use over time, and decreasing the favorability of alcohol expectancies can lead to decreased alcohol use, particularly among heavier drinkers (e.g., Darkes & Goldman, 1998; Dunn, Lau, & Cruz, 2000; Smith, Goldman, Greenbaum, & Christiansen, 1995; Stacy, Newcomb, & Bentler, 1991). Favorable, reinforcing depictions of alcohol use in movies imply that alcohol use has positive (or at least, not negative) consequences. Repeated exposure to these depictions may lead viewers to expect similar consequences to result from their own use of alcohol.

Cognitions as mediators of the relation between movie alcohol depictions and alcohol use

We proposed that favorable cognitions about alcohol use affect behavior through these cognitive mediators, consistent with the Prototype-Willingness Model (Gibbons, Gerrard, & Lane, 2003). Among adolescents, willingness to use alcohol mediates the effect of drinker prototypes on subsequent alcohol use (e.g., Gerrard et al., 2006; Gerrard et al., 2002). Drawing on these findings, we hypothesize that after being influenced by movie alcohol exposure, the effects of descriptive norms, drinker prototypes, and alcohol expectancies on alcohol consumption are mediated by the more proximal cognitive construct of behavioral willingness. Indeed, tests for racial differences in the effects of social influences on adolescent alcohol use in the current sample reveal that higher levels of exposure to movie

alcohol depictions predicted increased favorability of the drinker prototype, increased willingness to drink, and increased alcohol use prospectively, more so among Caucasian adolescents than African American adolescents (Gibbons et al., 2008). Similarly, smoking expectancies and perceptions of the prevalence of smoking among “kids who are like you” (p. 121) significantly mediate the effect of movie smoking depictions on adolescent smoking initiation (Tickle, Hull, Sargent, Dalton, & Heatherton, 2006). These results suggest that norms, prototypes, and expectancies are promising mediators of the effect of movie substance use depictions on adolescent substance use; however, no study to date has assessed the independent contributions of these multiple mediators.

Present research

In the current study, we examine the relations between exposure to movie portrayals of alcohol use, alcohol-related cognitions, and adolescent alcohol use among U.S. adolescents, controlling for possible confounding variables that are correlated with both movie alcohol exposure and alcohol-related cognitions and behaviors (e.g., age, personality, parenting). Friends' alcohol use, a risk factor strongly implicated in adolescents' use of alcohol (for reviews see Hawkins, Catalano, & Miller, 1992; Petraitis, Flay, & Miller, 1995; Wills & Cleary, 1999), is also included as an important mediator in our model, as peer groups of adolescents may have similar exposure to alcohol use in movies. Indeed, recent research reveals that exposure to movie smoking is associated with increased reports of peer smoking prospectively, and that this is a significant mediator of smoking onset (though a direct effect of movie smoking exposure on smoking onset remains; Wills et al., 2007). Also, exposure to movie alcohol depictions predicts reports of friends' alcohol use and changes in reports of friends' use over time, which predicts adolescents' own use (Gibbons et al., 2008). Research to date has not tested for effects on (and of) friends' use over and above the effects of expectancies and more general norms. In the current study, we obtained reports of friends' use (respondents' reports of how many of their friends use alcohol) and perceptions of use by young people more generally. Whereas exposure to movie alcohol depictions might bias perceptions of the general prevalence of alcohol use, it may be less likely to bias perceptions of the prevalence of alcohol use among one's close friends.

Using data from a nationally-representative, longitudinal telephone survey of U.S. adolescents, we specified a structural equation model (Figure 1) to test mediational paths from movie alcohol exposure to alcohol consumption. We hypothesized that greater exposure to movie alcohol use would lead to: a) greater perception that alcohol use is normative, b) more favorable images of young people who use alcohol, c) more positive expectancies regarding the benefits of alcohol, and d) reporting having more friends who drink. Increases in norms, prototypes, expectancies, and friends' use, in turn, should predict increased willingness to use alcohol, which serves as the proximal precursor to alcohol consumption. Therefore, we predicted significant indirect paths from movie alcohol exposure to alcohol consumption via willingness, through norms, prototypes, expectancies, and friends' use. Though not illustrated in Figure 1, we specified direct effects of confounding variables to predictor, mediator, and outcome variables at every step of the mediational pathway.

The technique of structural equation modeling (SEM) is particularly well-suited to addressing the current research question. First, SEM allowed us to test multiple pathways concurrently in the same statistical model. Second, SEM is a confirmatory technique—a priori, researchers construct a model based on theoretical predictions and this model is then tested to determine whether it is a reasonable representation of the data—this is in contrast to data-driven exploratory techniques in which the data are examined to identify patterns which can be used to develop theory post hoc. Finally, unlike path analysis, SEM

incorporates latent variables in the model; by incorporating measurement error in the model, the observed relations among latent variables are estimated with greater precision (see Ullman, 2001, for an introduction to SEM).

Methods

Participants and Procedure

Analyses were conducted on data from adolescents who participated in a random-digit-dial telephone survey of 10-14 year olds living in the U.S. Details regarding the survey participants and procedure have been previously reported (Sargent et al., 2005). Respondents were first contacted between June and October, 2003. Before the survey, we randomly selected 377,850 U.S. telephone numbers, purged non-residential telephone numbers, and screened 69,516 households for the presence of an eligible adolescent (29% of households refused the screener). The screening process identified 9,849 eligible households; 6522 adolescents (66% of those eligible) completed the first wave of the survey (T1). At T1, our sample had a mean age of 12.05 years ($SD = 1.39$) and was generally representative of the U.S. population aged 10-14 in terms of gender, ethnic and racial background, and socioeconomic status (for details see Sargent et al., 2005). Surveys were administered in either English or Spanish by trained interviewers using a computer-assisted telephone interview system. Participants responded to potentially sensitive questions by pressing numbers on their telephone keypad instead of responding aloud. Respondents were recontacted at 8-month intervals. The current analysis utilized data from all four waves of the survey (T1-T4), including all participants providing data at T1 and any subsequent wave (at each wave, survey staff attempted to recontact all the original participants).

Materials

Exposure to movie depictions of alcohol use—At T1, adolescents reported whether they had ever seen each of 50 different movies, randomly selected (without replacement) from a pool of 532 popular contemporary movies (the top-grossing movies each year from 1998 to 2002, and 32 movies grossing over \$15 million USD in the first quarter of 2003). At T2, respondents were asked about 50 randomly selected titles drawn from the top theatre releases and video rentals for the interval between the survey waves (161 movie titles). The random samples were stratified by Motion Picture Association of America rating (and at T2, source: theatre vs. video). Movies that a respondent reported seeing at T1 were excluded from his/her T2 sampling frame.

Respondent reports of movies seen were linked with data from a content analysis of alcohol depictions in movies. To quantify alcohol use depictions in movies, one of two trained coders viewed each movie and recorded the number of seconds of alcohol use. Alcohol use was defined as: a character's actual consumption of a beverage that clearly appeared to be alcoholic, implied possession of such a beverage (e.g., a character sitting in a bar with a filled beer glass), or purchasing of alcohol. We excluded occasions when characters were in possession of empty alcoholic beverage containers (beer bottles, wine glasses, etc.) and when alcoholic beverage containers were displayed but were not implied as being consumed (e.g., bottles behind a bar). Inter-rater reliability (based on double coding 10% of the movies) was $\kappa = .77$.

We linked the duration of alcohol use in each movie with the survey data to estimate exposure to movie alcohol depictions for each respondent. We did so by dividing the seconds of alcohol use that respondents reported seeing on their randomized movie list (i.e., sum of the movie alcohol durations for movies they said they saw) by the total amount of movie alcohol use included on their movie list (i.e., sum of the movie alcohol durations for

all movies they were asked about, whether they saw them or not). Exposure to movie alcohol depictions in a random sample of movies is an estimate of exposure to movie alcohol depictions in the population from which the sample is drawn. To estimate our participants' exposure to alcohol depictions in the larger pool of movies (hereafter referred to as "movie alcohol exposure") we multiplied the proportion just described by the total duration of movie alcohol depictions in the larger movie pool. In the current analysis, we quantified movie alcohol exposure up to T2 using movie alcohol exposure scores at T1 and T2 as two indicators of a latent construct.

Mediators—We measured participants' alcohol norms, expectancies, prototypes, and willingness to drink at T3. Having positive descriptive norms about alcohol was operationalized as a latent construct with two indicators: perceiving that "most kids your age have used alcohol" and "most kids your age have been drunk at least once" ($r = .64$). Expectancies were assessed using 8 items ($\alpha = .87$; randomly parceled into four indicators of a latent construct in order to ease computational complexity) tapping respondents' beliefs about the possible benefits of using alcohol (e.g., have more fun at parties, feel more part of the group). Alcohol prototypes were assessed using six attribute items ($\alpha = .82$; randomly parceled into three indicators of a latent construct) regarding respondents' images of the typical person their age who drinks (e.g., is cool, is popular). Willingness to use alcohol was assessed using two items ($r = .57$; indicators of a latent construct) asking respondents to report how willing they would be to have a drink of alcohol and to get drunk, if alcohol were available. At T3, we also asked participants how many of their friends drink alcohol.

Outcome variables—We measured alcohol consumption at T4, controlling for consumption at T3. Consumption was defined as a latent construct comprising frequency and quantity of use. Respondents were asked on how many days, over the past month, did they have a drink containing alcohol (with 5 response options, from "none" to "6 or more") and, among those reporting at least one drink per month, how many drinks they usually consumed on days that they drank (with 6 response options, from "none" to "10 or more;" respondents who reported no drink days were assigned a value of "none" for quantity).

Control variables—We assessed demographic, personality, and social influence factors expected to be significantly correlated with alcohol use, alcohol-related cognitions, and/or movie exposure. At T1, we assessed age, gender, racial or ethnic minority status, parent education, household income, self-esteem, self-regulation, and how many friends they have who drink alcohol. At T3, we assessed school performance, religious attendance, sensation-seeking (Zuckerman, Bone, Neary, Mangelsdorff, & Brustman, 1972), and rebelliousness (Pierce, Farkas, & Evans, 1993), perceptions of how often their parents drink alcohol, parental warmth, and parental demandingness (Jackson, Henriksen, & Foshee, 1998). Finally, we specified a latent construct for general media use using reported number of movies watched per week at T1, and daily hours of TV watched at T1 and T2.

Results

Descriptive Statistics and Overview of the Structural Model

At T1, median hours of exposure from the 532 movies was 4.50 (interquartile range: 2.05-8.05); at T2, median hours of exposure from the 161 movies was 1.60 (interquartile range: 0.90-2.54). We included both T1 and T2 movie alcohol exposure in the model so as to include both the larger pool of movies and those which most closely preceded the measurement of the hypothesized mediators. The distribution of movie alcohol exposure was positively skewed; a square root transformation was applied to seconds of movie alcohol exposure prior to running the structural model. Among the 4574 participants at T4,

2107 (46.06%) reported having ever tried alcohol (of these, 1140 (54.10%) reported that their parents did not know) and 792 (37.59%) reported drinking on at least one day in the past month. Most of those who drank in the past month had done so infrequently, but 32.19% reported having consumed more than one alcoholic beverage on more than one day.

We evaluated our model using full information maximum likelihood estimation with bootstrap routines in MPlus 4.1 (2006). Missing data were assumed to be missing at random conditional on covariates in the model (Schafer & Graham, 2002). The model provided reasonable fit to the data, $\chi^2(331) = 1880.04$, $p < 0.001$, CFI $> .97$, RMSEA $< .03$. The variance accounted for by prior variables in the model was 51% for norms, 52% for expectancies, 49% for prototypes, 78% for willingness, and 43% for T4 alcohol consumption (including the stability path from T3 alcohol consumption). A priori alpha level for parameter estimates and tests of indirect effects was set at $p < .01$. Figure 1 presents the results of the model estimation; though not illustrated, we included the covariates as direct predictors of each pictured variable.

Movie Alcohol Exposure and General Media Exposure

Movie alcohol exposure and general media exposure were correlated, $r = .51$, $p < .001$. General media exposure was associated with all covariates; movie alcohol exposure was significantly related to all the covariates except gender and household income.² Both movie alcohol exposure and general media exposure uniquely predicted alcohol consumption at T3; higher levels of movie alcohol exposure were associated with higher consumption ($z = 6.04$, $p < .001$), whereas higher levels of general media exposure (net of other variables) were associated with less alcohol consumption ($z = -3.56$, $p < .001$). After accounting for these relations with consumption at T3, movie alcohol exposure still had significant, unique effects on alcohol norms ($z = 4.89$, $p < .001$), prototypes ($z = 3.81$, $p < .001$), and expectancies ($z = 3.49$, $p < .001$). General media exposure (net other variables) had no unique effect on norms ($z = 0.28$, $p = .78$), but was associated with less favorable drinker prototypes ($z = -3.46$, $p < .001$) and less favorable alcohol expectancies ($z = -3.37$, $p < .001$). Greater movie alcohol exposure, but not general media exposure, was also associated with an increase in the number of friends who drink between T1 and T3 ($z = 7.33$, $p < .001$, and $z = -1.88$, $p = .06$, respectively). Neither movie alcohol exposure nor general media exposure had unique effects on willingness to drink at T3 ($z = 1.36$, $p = .18$, and $z = 0.63$, $p = .53$, respectively). Movie alcohol exposure did have an independent direct effect on alcohol consumption at T4 ($z = 2.48$, $p = .01$), but general media exposure did not ($z = -1.25$, $p = .21$).

Mediators: Norms, Expectancies, Prototypes, Friends' Use, and Willingness to Drink

The residual correlations among norms, expectancies, and prototypes were all positive: norms and expectancies $r = .03$ ($p < .01$), norms and prototypes $r = .06$ ($p < .001$), expectancies and prototypes $r = .14$ ($p < .001$). Higher levels of alcohol use at T3 predicted more favorable prototypes of drinkers ($z = 4.94$, $p < .001$) and more favorable expectancies about alcohol ($z = 12.64$, $p < .001$), but were unrelated to perceptions of alcohol use as normative ($\beta = .03$; $z = 1.62$, $p = .11$). Friends' use of alcohol at T3 (controlling for T1 friends' use) was a significant predictor of prototypes ($z = 17.98$, $p < .001$), expectancies ($z = 12.07$, $p < .001$), and norms ($z = 11.36$, $p < .001$). Own alcohol consumption at T3 and friends' use of alcohol at T3 were significantly, positively correlated ($r = .17$, $z = 12.82$, $p < .001$).

²Details regarding the relation between covariates and variables included in the model are available from the first author.

Consistent with our predictions, higher alcohol expectancies ($z = 18.91, p < .001$), more favorable drinker prototypes ($z = 7.58, p < .001$), higher use of alcohol by T3 ($z = 12.53, p < .001$), and increase in friends' use of alcohol at T3 ($z = 5.44, p < .001$) were significant predictors of increased willingness (see Figure 1). Contrary to prediction, descriptive norms regarding alcohol use were unrelated to willingness to drink ($\beta = .03; z = 1.63, p = .10$). Willingness to drink at T3 was a significant, unique predictor of change in consumption from T3 to T4 ($z = 5.28, p < .001$); we found no direct effects of norms, expectancies, and prototypes on change in consumption (all z s $> 2.28, p$ s $< .02$). Change in friends' use of alcohol from T1 to T3 also had a direct effect on change in consumption: despite a significant, unique, direct effect of friends' use at T1 on consumption at T4 ($\beta = .08; z = 3.35, p = .001$), there remained a significant, unique, direct effect of friends' use at T3 on consumption at T4 ($z = 4.12, p < .001$).

Mediated pathways to alcohol use

Total effects and all significant indirect effects are presented in Table 1. We evaluated whether the effects of movie alcohol exposure on alcohol consumption were mediated through norms, expectancies, prototypes, and their subsequent effects on willingness.² We found indirect paths from movie alcohol exposure to consumption through alcohol prototypes and willingness ($z = 2.86$) and through alcohol expectancies and willingness ($z = 2.93$). The indirect path via norms and willingness was nonsignificant ($\beta < .01; z = 1.37, p = .17$). Alcohol consumption at T3 was implicated in several paths from movie alcohol exposure to T4 consumption (see Table 1). We observed an indirect effect of movie alcohol exposure through T3 alcohol consumption directly to T4 consumption and an effect of movie alcohol exposure to T3 consumption to T4 consumption via willingness. We also observed indirect effects of movie alcohol exposure through T3 alcohol consumption and subsequent cognitions on T4 consumption. Again, norms were not implicated in any indirect paths from movie alcohol exposure to alcohol consumption. The predicted indirect path from movie alcohol exposure through friends' use to increased alcohol consumption at T4 was significant, as was the effect through friends' use on willingness at T3. There were also significant paths from movie alcohol exposure through friends' use to cognitions and T4 consumption. No other paths from movie alcohol exposure to T4 alcohol consumption were found to be significant.

Tests of indirect effects from general media exposure to alcohol consumption (see Table 1) almost exactly paralleled those for movie alcohol exposure, with two exceptions: friends' alcohol use was not implicated in any of the indirect paths and the direction of all the remaining significant indirect effects was negative (as opposed to the positive coefficients observed for movie alcohol exposure). Specifically, we observed negative paths from general media exposure to T4 alcohol use through T3 alcohol consumption and the effects of T3 alcohol consumption on subsequent cognitions. We also observed effects from general media exposure to alcohol prototypes, alcohol expectancies, and their effects on willingness and T4 alcohol consumption. None of the indirect paths through norms were significant.

Discussion

Consistent with our hypotheses, we found that after accounting for a range of potential confounding variables, movie alcohol exposure had significant unique influence on expectancies about alcohol use, prototypes of drinkers, friends' alcohol use, and willingness to use alcohol, and that these variables were associated with alcohol consumption and change in consumption over time. Contrary to our prediction, despite a significant influence of movie alcohol exposure on descriptive norms about alcohol use, we detected no subsequent influence of norms on willingness to drink or drinking behavior, suggesting that

perceptions about the behavior of one's friends are more influential than perceptions of same-age peers more generally.

Movie alcohol exposure, alcohol-related cognitions, and alcohol use

This study replicates prior research demonstrating an influence of movie alcohol exposure on adolescent alcohol use prospectively (Sargent et al., 2006; Stoolmiller et al., 2008) and does so while controlling for media-seeking personality factors (sensation seeking) and exposure to media more generally. We observed consistent, positive relations between movie alcohol exposure, mediators and behavior. In contrast, associations with general media use (movies watched per week and hours of TV watched per day) were either nonsignificant or negative.⁴ Findings from other studies (Dal Cin, Gibson, Zanna, Shumate, & Fong, 2007; Sargent et al., in press) suggest that it is images of substance use and not other aspects of media (general exposure or the type of adolescent attracted to media) that underlie the effects of movie substance use on exposure. It may be that once alcohol-related content is accounted for, the content which remains is not harmful (at least with regard to alcohol use). However, films rated for older audiences (PG13 and R) are responsible for most movie alcohol exposure (Dal Cin, Worth, Dalton, & Sargent, in press); thus it may also be that residual variation in the general movie variable is due to variation in child-oriented media. Further research is necessary to disentangle the potentially distinct (and opposite) contributions of alcohol imagery and child-oriented programming.

Consistent with previous studies (Gibbons et al., 2008; Tickle et al., 2006), the current study highlights the importance of cognitive mediators of the effects of movie exposure on alcohol consumption and demonstrates that prototypes and expectancies are independent mediators which influence behavior through their effects on willingness to use alcohol. Researchers who have found that exposure to alcohol advertising did not predict expectancies after accounting for peer use have speculated that this may be because “young people are likely to be influenced more strongly by their peers, parents, and important adults with whom they have a relationship than by people they do not know and perhaps do not care about” (Martino, Collins, Ellickson, Schell, & McCaffrey, 2006, p. 980). We suggest that in terms of impact on behavior, the influence of movie alcohol depictions⁵ may be more like the effect of parents, peers, and siblings than traditional forms of advertising. Young people can identify with substance-using movie characters (Dal Cin et al., 2007), and this parasocial relationship, along with the tendency to view the messages in movies as entertainment (without the skepticism directed at an advertising message), could make the exposure-behavior relation for this type of media stronger than that seen in traditional forms of advertising (cf. Dal Cin, Zanna, & Fong, 2004).

Movie alcohol exposure, friends' alcohol use, and alcohol norms

The current study also conceptually replicates prior longitudinal research (Wills et al., 2007) demonstrating that changes in friends' smoking mediate the relation between exposure to movie smoking exposure and smoking onset, providing convergent evidence that friends play an important role in movie effects on substance use. To the extent that reports of friends' use accurately reflect friends' actual use, our results suggest that exposure to media alcohol use leads to increases in friends' use and subsequent own use, either through direct effects on long-term friends or through changing affiliations. In contrast to friend use,

⁴We specified directional paths from T3 alcohol consumption and friends' use to T3 norms, expectancies, and prototypes, as the former are conceptually prior to the latter. An alternative would be to specify correlations among all T3 variables, which produced very similar results—model fit was identical, the size of indirect paths through T3 alcohol consumption and friends' use were identical, and the size of paths via the T3 cognitive mediators were the same or larger.

⁵Movie alcohol depictions can be a type of alcohol advertising; indeed, some portrayals that depict alcohol brands may be product placements, in which manufacturers pay a fee to have their brand included in a film.

perceptions of alcohol use among peers more generally (i.e., norms) did not mediate the movie alcohol effect, over and above the effects of expectancies, prototypes and use by friends. However, the design of the current study does not allow us to identify precise relations between movies, friend use of alcohol, and alcohol consumption, and the lack of data on friends' actual alcohol use warrants caution in interpreting these findings. Further research, particularly longitudinal studies tracking peer networks, will be crucial in clarifying the relations between movies, peers, and behavior (Valente, Gallaher, & Mouttapa, 2004).

Future directions

The current study has a number of limitations that should be addressed in future research. The current sample was randomly selected, but not all individuals we contacted agreed to participate in the eligibility screening or the survey itself. Though the demographic characteristics (e.g., for age, gender, race) of the current sample are similar to those found in US census data (see Sargent et al., 2005), we may have nevertheless underrepresented certain groups (e.g., children in homes without landlines) who are likely underrepresented in all surveys. Furthermore, there was some attrition from the study over time. By using full information maximum likelihood estimation (which assumes that data are missing at random and any missingness is conditional on covariates in the model), we have attempted to minimize any bias due to differential attrition.

We did not address socioeconomic, racial/ethnic, or cultural differences that might moderate the effects of movie alcohol exposure. Given evidence of demographic differences in patterns of substance use (Johnston, O'Malley, Bachman, & Schulenberg, 2007) and peer influence (Flay et al., 1994; Hamm, 2000; Robinson et al., 2006; Vaccaro & Wills, 1998; but see also Rowe, Vazsonyi, & Flannery, 1994) it will be important to examine whether the model presented here is equally predictive across various subgroups. Indeed, recent evidence has emerged for racial/ethnic differences in the effects of movies on smoking (Jackson, Brown, & L'Engle, 2007) and alcohol consumption (Gibbons et al., 2008). We look forward to further research focused on why African American adolescents, while highly exposed to media, seem to be less responsive to it as compared to adolescents from other backgrounds. In addition, American movies are distributed and seen worldwide. Results of studies on the impact of movie substance use on substance use among youth in other countries are remarkably similar to those obtained in U.S. samples (e.g., Hanewinkel & Sargent, 2007; Hanewinkel et al., 2007). It is unclear whether the mediational results obtained here will generalize to other cultural contexts where media content, interpretation of U.S. media, and social influences might differ. Further cross-cultural research is necessary to understand the role of U.S. movies on adolescents of different backgrounds and cultures, both within the U.S. and in other countries.

Though important questions remain, the current results provide insight into the psychological and social processes accounting for the effects of movie substance use depictions on actual substance use among adolescents. We demonstrate that even after accounting for a wide range of demographic and social influence variables, exposure to movie alcohol use is a unique social influence on adolescent alcohol consumption, and suggest that exposure to pro-substance use messages in the entertainment media deserve consideration in investigations of adolescent substance use.

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Figure 1.

Structural equation model of movie alcohol exposure and alcohol consumption.

Note. All coefficients are standardized. All paths are significant at $p = .001$. To reduce clutter, correlations among residual influences at T3 have been omitted from the diagram, see text.

Table 1

Standardized Total and Indirect Effects for Structural Model

	Movie alcohol exposure		General media exposure	
Effect on T4 Alcohol Consumption	<u>B</u>	<u>T</u>	<u>B</u>	<u>T</u>
Total Effects	0.21	6.96	0.04	-3.05
Total Indirect Effects	0.13	7.22	0.02	-3.14
Specific Indirect effects *				
via T3 Friends' Use only	0.02	3.64	<i>ns</i>	<i>Ns</i>
via T3 Alcohol Consumption only	0.05	4.11	0.01	-2.99
via T3 Willingness				
and T3 Alcohol Consumption	0.02	3.74	0.01	-2.90
and T3 Friends' Use	0.01	3.37	<i>ns</i>	<i>Ns</i>
and T3 Alcohol Expectancies	0.01	2.95	0.01	-2.97
and T3 Friends' Use	0.01	3.82	<i>ns</i>	<i>Ns</i>
and T3 Alcohol Consumption	0.01	4.02	< 0.01	-3.08
and T3 Alcohol Prototypes	0.01	2.92	< 0.01	-2.96
and T3 Friends' Use	< 0.01	3.61	<i>ns</i>	<i>Ns</i>
and T3 Alcohol Consumption	< 0.01	3.18	<0.01	-2.73

Note: N = 6522.

* Only significant indirect effects are show

Appendix

Correlation Matrix for the Structural Model

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35								
1 Movies per week	–																																										
2 TV hours per day		.20	–																																								
3			.18	.49	–																																						
4 Movie alcohol exposure				.26	.14	.15	–																																				
5					.21	.08	.12	.59	–																																		
6 Friends' alcohol use						.11	.05	.07	.42	.31	–																																
7 Willingness to drink							.08	.04	.07	.34	.26	.55	–																														
8 Willingness to get drunk								.09	.01	.05	.28	.21	.44	.60	–																												
9 Norms Most have tried									.09	.36	.27	.45	.35	.25	–																												
10 Most have been drunk										.12	.09	.10	.33	.25	.43	.29	.27	.64	–																								
11 Alcohol prototype											.03	.03	.04	.30	.21	.50	.47	.35	.32	.29	–																						
12												.04	.02	.04	.28	.20	.46	.42	.33	.28	.25	.60	–																				
13													.03	-.01	.02	.29	.18	.50	.44	.34	.35	.31	.62	.64	–																		
14 Alcohol expectancies														.04	.03	.04	.29	.21	.49	.58	.49	.30	.24	.47	.39	.42	–																
15															.06	.04	.04	.32	.22	.50	.60	.53	.32	.29	.45	.38	.40	.74	–														
16																.03	.01	.03	.25	.19	.38	.43	.37	.26	.22	.37	.29	.33	.60	.56	–												
17																	.05	.04	.06	.25	.20	.42	.50	.43	.26	.23	.40	.33	.35	.70	.63	.64	–										
18 Alcohol frequency																		.08	.01	.02	.28	.22	.43	.44	.40	.26	.23	.30	.27	.28	.36	.40	.28	.30	–								
19 Alcohol quantity																			.08	.00	.02	.29	.22	.44	.44	.43	.24	.25	.30	.27	.28	.36	.40	.28	.30	.82	–						
20 Alcohol frequency																				.06	.01	.00	.27	.21	.45	.48	.47	.24	.23	.33	.28	.29	.42	.46	.29	.33	.46	.44	–				
21 Alcohol quantity																					.06	.00	.00	.27	.19	.44	.48	.51	.23	.23	.31	.28	.29	.42	.46	.29	.35	.46	.49	.83	–		
22 Age																						.04	.06	.06	.41	.24	.52	.32	.25	.44	.44	.39	.33	.42	.33	.33	.28	.27	.26	.27	.25	.25	–
23 Parent Education																																									–		
24 Self-Esteem																																								–			
25 Friends' alcohol use																																							–				
26 Gender																																						–					
27 Household income																																						–					
28 Racial/ethnic minority																																					–						
29 Self-regulation																																					–						

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
30 Parent alcohol use	-.03	-.03	-.01	.10	.11	.15	.20	.11	.08	-.01	.17	.14	.14	.20	.19	.13	.15	.18	.15	.16	.12	.05	.15	-.01	.08	-.01	.21	-.14	-.05	–					
31 Attend religious activities	-.05	-.08	-.07	-.18	-.13	-.17	-.19	-.17	-.10	-.08	-.14	-.11	-.12	-.15	-.18	-.14	-.14	-.12	-.14	-.13	-.14	-.12	.02	.06	-.12	.05	-.02	.03	.10	-.19	–				
32 School performance	.10	.12	.13	.16	.13	.17	.19	.17	.18	.20	.11	.11	.07	.16	.19	.13	.15	.10	.13	.11	.12	.10	-.20	-.19	.10	-.12	-.17	.12	-.23	.01	-.10	–			
33 Sensation-seeking	.17	.12	.13	.29	.27	.34	.37	.29	.28	.24	.29	.25	.24	.33	.33	.29	.31	.23	.24	.24	.24	.16	-.09	-.16	.22	-.10	-.08	-.03	-.29	.12	-.18	.28	–		
34 Rebelliousness	.14	.12	.14	.20	.19	.30	.33	.29	.23	.22	.23	.21	.18	.31	.34	.27	.31	.20	.22	.24	.23	.08	-.11	-.15	.18	-.18	-.12	.07	-.32	.08	-.15	.34	.52	–	
35 Parental warmth	-.08	-.07	-.10	-.22	-.17	-.31	-.32	-.24	-.23	-.20	-.29	-.22	-.25	-.32	-.35	-.29	-.30	-.19	-.19	-.24	-.23	-.21	.04	.22	-.22	.04	.05	-.05	.24	-.12	.16	-.26	-.33	-.37	–
36 Parental supervision	-.05	-.08	-.12	-.26	-.17	-.35	-.36	-.29	-.25	-.21	-.32	-.25	-.28	-.38	-.39	-.32	-.35	-.24	-.23	-.27	-.26	-.27	.02	.17	-.24	.06	.00	-.01	.22	-.13	.19	-.19	-.31	-.32	.58