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Media as Social Influence: Racial Differences in the Effects of Peers and Media on Adolescent Alcohol Cognitions and Consumption

Frederick X. Gibbons,
Department of Psychological and Brain Sciences, Dartmouth College

Elizabeth A. Pomery,
Department of Psychology, Yale University

Meg Gerrard,
Dartmouth Medical School

James D. Sargent,
Dartmouth Medical School

Chih-Yuan Weng,
Department of Psychological and Brain Sciences, Dartmouth College

Thomas A. Wills,
Cancer Research Center of Hawai'i

John Kingsbury,
Department of Psychological and Brain Sciences, Dartmouth College

Sonya Dal Cin,
Department of Communications, University of Michigan

Keilah A. Worth,
Dartmouth Medical School

Mike Stoolmiller,
University of Oregon

Susanne E. Tanski, and
Dartmouth Medical School

Hsiu-Chen Yeh
Iowa State University

Abstract

Racial differences in the effects of peer and media influence on adolescents' alcohol cognitions and consumption were examined in a large-scale panel study. With regard to peer influence, results from cross-lagged panel analyses indicated that the relation between perceived peer

Correspondence concerning this article should be addressed to Frederick X. Gibbons, Department of Psychological and Brain Sciences, 6207 Moore Hall, Dartmouth College, Hanover, NH 03755; or rick.gibbons@dartmouth.edu.

drinking and own drinking was significant for both Black and White adolescents, but it was stronger for the White adolescents. With regard to media influence, structural modeling analyses indicated that exposure to drinking in movies was associated with more alcohol consumption 8 months and 16 months later. These effects were mediated by increases in: the favorability of the adolescents' drinker prototypes, their willingness to drink, and their tendency to affiliate with friends who were drinking. Multiple group analyses indicated that, once again, the effects (both direct and indirect) were much stronger for White adolescents than for Black adolescents. The results suggest media influence works in a similar manner to social influence, and that Whites may be more susceptible to both types of influence.

Keywords

media influence; adolescent drinking; prototype-willingness

African American (Black) adolescents start using substances later on average than do European American (White) adolescents and they use them less frequently (Johnston et al., 2005; Wallace et al., 2002). This is true in spite of the fact that Black adolescents are more likely to be raised in environments that provide opportunities to use (i.e., substance availability; LaVeist & Wallace, 2000) as well as a reason (i.e., more stress; Walker et al., 2000). Although many researchers have discussed this important paradox, there is no consensus as to why it exists. One hypothesis, explored in this study, involves social influence: Black adolescents are thought to be less vulnerable to peer pressure than are White adolescents (see Hoffman, Monge, Chou, & Valente, 2009, for a review). There is some evidence in support of this assumption, but it is mostly indirect. For example, the correlation between reports of friends' use and own use, which is often seen as an indicator of peer influence, is usually lower among Blacks than Whites (Hamm, 2000; Robinson et al., 2006; Vaccaro & Wills, 1998). "Cognitive" social influence also appears to be less pronounced among Blacks. Adolescents tend to overestimate the prevalence of substance use among their peers (Prentice & Miller, 1993), and this overestimation is associated with more use (Graham, Marks, & Hansen, 1991); but this tendency is also less common among Black adolescents (Robinson et al., 2006).

Several contributing factors, all of which center around minority status, have been proposed to explain why Black adolescents appear to be less vulnerable to social influence. These include a tendency toward defensiveness and/or a healthy mistrust of others (Flay et al., 1994; Landrine et al., 1994; Unger et al., 2001; Yerger, Daniel, & Malone, 2005), and a general perspective that orients more toward independence or distinctiveness than conformity or compliance (Unger, 2003). This apparent tendency to resist peer influence takes on added significance because it appears to be a protective factor for Black adolescents with respect to substance use.

Racial Differences in Media Influence

Substance availability is not the only risk factor that is higher for Black adolescents. They also watch more television and see more movies than adolescents of other racial / ethnic groups (Roberts & Foehr, 2004), which means they are exposed to more alcohol advertising and product placement (Center on Alcohol Marketing & Youth, 2003; Chen et al., 2002; Yerger et al., 2005). They also are exposed to more tobacco marketing (Schooler et al., 1996). Similar exposure patterns can be seen with other types of media, as well. For example, rap music, which is more popular among Black adolescents than other adolescents (Roberts et al., 1999), also contains more references to drugs and alcohol than do other

music genres (Chen, Miller, Grube, & Waiters, 2006; Roberts & Christenson, 2000; Waiters, 2004).

Studies of racial differences in media influence on health behavior are rare, but a few exist. Chen et al. (2002) examined the effects of tobacco advertising on a sample of 20,332 adolescents (7% Black). They reported that the Black adolescents were less "receptive" than were the Whites, meaning they were less likely to have a favorite product and reported less interest in the advertised brands. The study was cross-sectional, however, which limited the authors' ability to draw conclusions about the reasons for the racial difference. Similarly, Jackson, Brown, and L'Engle (2007) found that self-reported exposure to R-rated films correlated with self-reports of smoking initiation for White but not for Black adolescents. Finally, Brown et al. (2006) assessed the impact of different kinds of media on the sexual behavior of Black and White adolescents ages 12 to 14. Their results replicated an earlier study (Collins et al., 2004) in showing that adolescents' exposure to sexual content on TV was associated with more advanced sexual behavior a year later. However, this exposure predicted change in behavior only for the Whites. Media exposure was correlated with sexual behavior for the Black adolescents at both waves, but it did not predict behavior change, suggesting that the media influence was weaker for them. To address the racial differences question, in terms of both media and peer influence, prospective studies of health behavior and media exposure that control for possible confounding variables (e.g., dispositions, parental drinking) are needed. That was the purpose of the current study.

Media as Social Influence

"Superpeers"—In discussing their results, Brown et al. (2006) argued that the media may act as a superpeer for adolescents, "providing models of attractive older adolescents engaging in risky behaviors that may not be condoned in the teen consumer's own peer group." (p. 1019). Others have proposed a similar analogy (Charlesworth & Glanz, 2005; Wakefield et al., 2003). The basic idea is that actors influence adolescents' behavior in a manner that is more subtle and indirect than that associated with peer influence, but is nonetheless similar in terms of process. Actors can't provide access to substances, for example, but they can model use *and* they can influence attitudes toward use. Some indirect evidence of this can be seen in a recent study by Wills, Sargent, Gibbons, and Stoolmiller (2007a) that looked at the effects of movie tobacco exposure on smoking onset 18 months later in a sample of 2,614 adolescents from Northern New England (94% White; *M* age at Wave 1 = 12). Results indicated that exposure had a direct effect on the adolescents' smoking initiation, as well as an indirect effect through changes (from Wave 1 to Wave 2) in their reports of the number of their friends who smoke. The authors suggested that seeing young and attractive actors smoking in movies may have increased adolescents' desire to affiliate with smokers and this "social mechanism," in turn, led to a greater likelihood of smoking. To the extent that media and peer influence involve similar processes, it would be expected that Black adolescents may be less susceptible to media influence, just as they appear to be less susceptible to peer influence.

Movie effects—Smoking and drinking are both very common in movies (Roberts, Henriksen, & Christenson, 1999), but that portrayal seldom includes any negative consequences (Everett, Schnuth, & Tribble, 1998; Roberts, Henriksen, & Foehr, 2004; Stern, 2005). That appears to be one reason why objective assessments of smoking and alcohol portrayal, which are based on independent coding of movies (see below), have been linked with initiation and escalation of both smoking (Dalton et al., 2003; Sargent et al., 2007) and drinking (Sargent, Wills, Stoolmiller, Gibson, & Gibbons, 2006) in U.S. samples. Similar results have been found in other countries as well (e.g., Germany: Hanewinkel et al., 2007; Mexico: Thrasher et al., 2008). These studies, along with Wills et al. (2007a) and the

current study, are part of the Dartmouth Media Project, which is an ongoing line of research that is examining the impact of substance portrayal in movies on substance use among adolescents (Sargent et al., 2005).

The impact of movie exposure in these studies has been significant, with partialled effect sizes equaling those of parent and sometimes even peer influence. It would appear, then, that when it comes to risky behaviors, entertainment media may be as influential as peers (Strasburger, 2006). Why that is the case is not clear, however; until recently, little attention had been paid to the question of what factors mediate these effects. One of the recent studies from the Dartmouth Media Project (Tickle, Hull, Sargent, Dalton, & Heatherton, 2006) found that the effect of movie smoking portrayal on smoking initiation was partially mediated by the positive effect that portrayal had on smoking expectancies. Another study by Dal Cin et al. (2009), which was based, in part, on the prototype - willingness model (Gibbons, Gerrard, & Lane, 2003), found that movie alcohol exposure was associated with increases in adolescent drinking and that this effect was mediated by alcohol expectancies (similar results were reported by Wills et al., 2009) and alcohol images or prototypes. The current study also used the prototype - willingness model, this time to examine racial differences in cognitive mediation of media alcohol effects.

What Mediates Media Effects: The Prototype – Willingness (Prototype) Model

The prototype model is described in detail elsewhere (Gerrard, Gibbons, Houlihan, Stock, & Pomery, 2008; Gibbons et al., 2009). Briefly, it is a modified dual-process model that focuses on the cognitions that mediate the effects of environmental factors (peer use, stress, context) on adolescent health behavior. Its basic contention is that some adolescent health risk behavior is intentional, but much of it is not; instead, it is a *reaction* to social situations (cf. Reyna & Farley, 2006). Thus, there are two pathways to health risk, the *reasoned* path and the *social reaction* path. The latter path includes two constructs that distinguish the model from other theories of health behavior. One is risk prototypes or *images* (the two terms are used interchangeably here) that are associated with different risk behaviors—i.e., perceptions of the *type* of person who engages in the behavior (the “typical” smoker, for example). The other is *behavioral willingness* (willingness), which is defined as an openness to risk opportunity—what an adolescent (or adult) would be willing to do in certain risk-conducive situations (e.g., an interested potential sex partner, available drugs at a party).

These two constructs have been shown to have good reliability (αs for prototypes and willingness typically > .75; for both, test-retest *r*s > .50), and good predictive and discriminant validity (see Gibbons et al., 2003, for discussion). Several studies have shown that willingness is a strong predictor of adolescent behavior net the more common proximal antecedent, behavioral intention (e.g., Gerrard, Gibbons, Brody, Murry, & Wills, 2006; Pomery, Gibbons, Reis-Bergan, & Gerrard, 2009; Rivis, Sheeran, & Armitage, 2009), and also that favorable risk images are prospectively associated with willingness (e.g., smoker prototypes; Hampson et al., in press; Hukkelberg & Dykstra, 2008; Rise & Skalle, 2006; Spijkerman et al., 2005). Moreover, these images begin to develop at an early age-- as young as 7 or 8 (Andrews & Peterson, 2006; Wills, Ainette, Mendoza, Gibbons, & Brody, 2007b)--well before adolescents report any willingness to engage in risky behaviors (Gerrard et al., 2005), which adds to their predictive utility. Media influence clearly involves images, which means, like social influence, it most likely follows the social reaction path to behavior. More generally, it also suggests that the prototype model would be particularly useful for examining both social influence (Gibbons et al., 2004) *and* media effects.

Examining Movie Alcohol Exposure (MAE) Effects

Media and peer influence—The three primary purposes of this study were to: a) use prospective analyses to examine racial differences in social influence regarding alcohol use, b) use the prototype model to examine cognitive factors that mediate MAE effects (defined as the impact of alcohol exposure in movies on drinking behavior), and c) determine if there are racial differences in these effects. The assumption was that media influence works in a similar fashion to peer influence. Predictions were that social influence—from peers *and* movies-- will be less pronounced among Black than White adolescents; and that risk cognitions (prototypes and willingness) and peer influence (friends' use) will mediate the media effects (cf. Wills et al., 2007a). Specifically, the anticipated pathway of media influence was: MAE → Alcohol prototype / friends' use → Alcohol willingness → Δ Drinking; with the first two relations (the social influence relations) being weaker for Blacks.

Covariates—There are a number of individual differences that could affect media preferences and therefore media effects. For example, adolescents who are high in risk-taking tendencies or rebelliousness, or have parents who drink, may choose to view movies that happen to have more alcohol in them, and they may also have more favorable alcohol images. Thus, what might look like media influence effects (on images, for example) could simply reflect the effects of confounding factors, like risk-taking. Consequently, analyses included a series of covariates; e.g., age, gender, parental drinking, sensation-seeking. Paths were estimated from each one of the covariates to each one of the endogenous constructs. Controlling for these measures will increase confidence that media influence effects are due to media exposure, rather than the preferences / characteristics of the adolescents.

Analyses

There were two primary sets of analyses. The first set was a cross-lag analysis comparing Whites and Blacks in terms of social influence—i.e., the own drinking → friends' drinking, and the friends' drinking → own drinking relations. The second set was a structural equation model (SEM) of factors thought to mediate the effects of MAE on drinking for Blacks and Whites; the SEM analyses included a multigroup model comparing the two groups on these effects.

Method

Recruitment, Participants, and Procedure

Recruitment and procedure—An extensive description of the recruitment methods for the Dartmouth Media Project can be found in Sargent et al. (2005). Briefly, in 2003, a random-digit dial telephone survey identified 9,849 eligible households with adolescents 10 to 14 years of age. Permission to interview their child was obtained from 77% of the parents; 87% of these children (N = 6,522; M age = 12.1; 49% female) agreed to participate. This response rate is typical for this kind of survey. Comparisons with the 2000 U.S. Census, in terms of age, sex, household income, and census region, suggested that the final sample was representative of the U.S. population (Sargent et al., 2005). The interviews, which lasted about 25 minutes, included questions on movie watching and demographics as well as the various health cognitions. They were conducted in English or Spanish by trained interviewers using a computer-assisted telephone interview (CATI) system. To insure privacy, participants were allowed to key in answers to sensitive questions on the telephone keypad. Three follow-up surveys were conducted at 8-month intervals. Of the 6,522 baseline participants, 4,037 were White and 704 were Black.[1] Rates of attrition were higher among adolescents who were: from lower SES, Black, lower in school performance, and high on sensation-seeking (all of which are typical for longitudinal studies of adolescent health

behavior; cf. Wills, Walker, & Resko, 2005). Attrition rates by race are presented in Table 1. Baseline drinking status and MAE were not related to attrition, however. The project was approved by the IRBs at Dartmouth College and Westat, Inc.

Exposure assessment at W1 and W2—As in previous studies (Sargent et al., 2008), the Beach method for determining MAE was used. First, a sample of 693 popular movies and videos was selected (from 1998 - 2003) based on box office success. Second, the CATI survey was programmed to randomly select 50 movie titles from the pool of movies for each interview. Movie selection was stratified by rating so that the distribution in each participant's list reflected the distribution of the full sample: 19% G/PG, 41% PG-13, 40% R. At each wave, respondents were asked whether they had ever seen each of the 50 movies on their unique list (yes / no). Responses were tracked, so that movies that respondents indicated they had seen at W1 were not included in their W2 list. Previous studies have shown that adolescents reliably remember movies they have seen 1-2 years prior to a survey (Sargent et al., 2001). Third, trained coders timed alcohol use in each of the 693 movies by recording how many seconds alcohol use appeared on the screen during the film. Coding indicated that 83% of the movies contained at least one alcohol occurrence.

To create a measure of alcohol exposure at each wave, the total time of alcohol use in the films each adolescent had seen from his/her unique list of 50 movies at each wave was summed. This number was then divided by the total time of alcohol use the adolescent would have seen had s/he seen all 50 movies in the list. This proportion was multiplied by the amount of drinking occurrences in the entire parent sample of 693 movies to obtain the exposure measure. On average, each adolescent had 31 minutes of MAE in his/her list of 50 movies at each wave. Square root transformation was used on exposure time to make it conform more closely to the assumption of multivariate normality. MAE at W1 and W2 were added together for analysis.

Measures

Covariates—W1 covariates included: *age; gender* (0 = male, 1 = female); *SES* (adolescents' reports of their *parents' education level*, from 0 = *high school or less* to 2 = *college or advanced degree*, and *income*, from 0 = < *$20K* to 2 = > *$50K*); and *school grades* (from 1 = *below average* to 4 = *excellent*). In addition, there were two individual difference measures adapted from existing scales: *sensation-seeking* (4 items from Sargent, Tanski, Stoolmiller, & Hanewinkel, 2010; e.g., "I like to do scary things." $\alpha = .60$), and *rebelliousness* (6 items from Pierce, Farkas, & Evans, 1993; e.g., "I like to break the rules" from 1 = *not like you* to 4 = *just like you*; $\alpha = .73$). Finally there was a single item on frequency of parent drinking, reported by the adolescent at W3 (from 0 = *never* to 4 = *every day*).

Endogenous and outcome measures—At W3, alcohol *prototypes* (favorability) were assessed as in previous studies (Gibbons et al., 2003), by asking respondents to describe the type of person their age who drinks alcohol, using a series of six adjectives; they were: cool, popular, smart, attractive, sexy, and dull (reversed), each on a 3-point scale (*not at all* to *very*; $\alpha = .83$). Alcohol *willingness* was assessed, also as in previous studies, by first presenting a description of a hypothetical scenario: "Suppose you were at a party with friends and there was alcohol there to drink," followed by a pair of items: "How willing would you be to drink…[one drink]…[enough to get drunk]?" each on a 3-point scale (*not at*

[1]There were also 1,222 Hispanic adolescents, 140 Asian American, and 374 multiracial / multiethnic adolescents in the sample; of this latter group, 131 indicated they were Black and at least one other racial / ethnic group. Because it was not clear which group to assign them to, and there weren't enough of them to identify as a separate group, we chose not to include them in the analyses. Similarly, a comparison of all different groups was beyond the scope of this paper.

all, kind of, very willing; αs: W3 = .75; W4 = .76). The f*riends' drinking* question (W3) was: "How many of your friends drink alcohol?" on a 3- point scale (*none, some, most*). Four items were used to assess *drinking*: number of days drinking in the past month (from 1 = *none* to 5 = *6 or more days*; those who never drank were coded as 0); amount typically consumed on drinking days in the past month (from 1 = *none*, to 7 = *10 or more drinks*; again, nondrinkers were coded as 0); and c) two dichotomous (0 = No, 1 = Yes) binge drinking items: had 5 or more drinks of alcohol in a row, for lifetime and past month. These four items were standardized before combining (αs: W3 = .86, W4 = .87). [2]

Results

Part 1: Social Influence: Cross-Lags

A cross-lag, multigroup model was specified that included (own) drinking and friends' drinking at W3 and W4. All covariates (assessed at W1) were included in the analyses. Fig. 1 presents the results of the two Black – White comparisons: friends' drinking → own drinking, and then own drinking → friends' drinking. In each case, the paths to be compared were first estimated freely across groups, and then constrained to be equal. A significant increase in χ^2 across analyses indicates there are significant differences in the strengths of the paths or covariances between groups. Both comparisons produced significant changes in χ^2. The friends' drinking to own drinking (social influence or "socialization") path was significantly stronger for Whites: $\Delta\ \chi^2\ [1] = 6.50$, $p = .01$. Conversely, the own drinking to friends' drinking (selection) path was significantly stronger for Blacks: $\Delta\ \chi^2\ [1] = 9.43$, $p < .003$. In addition, the covariance between own and friends' drinking was stronger for the Whites at W3: $\Delta\ \chi^2\ [1] = 14.63$, $p < .001$, and at W4 (the W4 relation was the covariance of Δ own and Δ friends' drinking): $\Delta\ \chi^2\ [1] = 5.84$, $p < .02$. Finally, the drinking stability (W3 → W4) path was significant and comparable for the two groups (Bs: Whites = .51, Blacks = .42, both *p*s < .001); in contrast, although the stability path for friends' use was significant for both groups, it was significantly weaker for Blacks (Bs: Whites = .46, Blacks = .28; both *p*s < .001; for the Black – White difference: $\Delta\ \chi^2\ [1] = 7.80$, $p < .006$). In short, these prospective results add to previous cross-sectional studies suggesting more susceptibility to social influence for Whites than Blacks (Hamm, 2000).

Part 2: MAE Effects

The primary analysis was a multigroup SEM, using *Mplus* Version 3.11 (Muthen & Muthen, 1998 - 2004) with Full Information Maximum Likelihood (FIML) estimation to handle missing data. With FIML (also called direct maximum likelihood estimation), missing values are not imputed; instead, model parameters and standard errors are estimated directly using all available data for each observation/case. FIML is well suited for estimating the mean vector and covariance matrix for a set of variables that are expressed as a function of the model parameters, e.g., SEM (Enders, 2006). Also, *Mplus* allows estimation of specific indirect (mediated) paths from exogenous to outcome constructs (e.g., MAE → cognitions → outcome).

Means and Correlations

Racial differences—Table 2 presents the *M*s, *SD*s, skewness, and zero-order correlations for the primary measures by racial group. For drinking, 14% (W3) and 18% (W4) of the sample said they had had at least one drink in the last month; 4% (W3) and 5% (W4) said

[2]Risk cognitions (willingness and prototypes) were not available at T1 and T2. Prototypes and friends' drinking were assessed at T4, but they were not included in the analyses, because we were interested in predicting own drinking, which was the only outcome measure (T4 friends' drinking was included in the cross-lag analyses). There was a single-item (lifetime) drinking measure in the first two waves, but there was very little drinking at either of these waves.

they had binged (5 or more drinks at one time) in the last month. Blacks had less willingness and use at both waves than did Whites (all *p*s < .001). This occurred in spite of the fact that Blacks scored higher on every risk factor except two (all *p*s < .001), including contextual factors (e.g., lower SES, more urban location), individual differences (e.g., poor school performance, rebelliousness) and MAE (i.e., they saw more movie alcohol use; this difference remained significant, even when controlling for total amount of TV and movie viewing). The two exceptions were parental drinking, which was lower for Blacks at both waves (*p*s < .001), and friends' drinking, which was not significantly different at W3, but was greater for Whites at W4, although the difference was modest (*p* = .05). In addition, a clear pattern emerged in the correlations: most were significant for the Blacks, but they were much stronger for the Whites (for all but two of the 21 pairs, the Black / White difference in magnitude of the correlations was significant, *p*s < .001).

SEM: Measurement Model

A confirmatory factor analysis (CFA) was first conducted on the 13 constructs using FIML to determine if the various indicators loaded on the constructs as expected. Four endogenous / outcome constructs (images, willingness, and W3 and W4 drinking) were specified as latent constructs. The seven controls, plus MAE and W3 friends' use (both single items), were specified as manifest variables. Indicators were the measures described earlier. The CFA indicated a good fit of the model to the data; χ^2 (252, N = 4740) = 872.4; Comparative Fit Index (CFI) = .99, Tucker-Lewis Index (TLI) = .97, Root Mean Square Error of Approximation (RMSEA) = .032. All completely standardized factor loadings > .51.

SEM: Full model

The model was specified according to the hypotheses (presented earlier), which were derived from the prototype model and from previous research on movie effects (e.g., Wills et al., 2007a; 2009). W3 drinking was included in order to assess the direct MAE effect at W3; and it was used as a covariate, to examine the effect of MAE on change in drinking (from W3 to W4). W3 drinking was also allowed to correlate with the other W3 endogenous constructs—reflecting the fact that risk behavior and risk cognitions are reciprocally related (Gerrard, Gibbons, Benthin, & Hessling, 1996). The same was done for W3 friends' use. All specified / predicted paths were significant. Results are presented here first for the overall sample, then the two groups separately, followed by the multi-group (Black - White) comparisons. Because the focus of the analyses was on racial differences, the SEM presented in Fig. 2 is the multigroup ("stacked") model showing separate (unstandardized) estimates for Blacks and Whites.

Covariates—Relations were estimated between the covariates and all of the endogenous constructs and outcomes (see Table 3). Age, sensation seeking, and rebelliousness were significantly associated with all endogenous constructs and outcome for both Blacks and Whites, whereas parental drinking was significantly associated with all constructs for Whites and all but W3 willingness for Blacks. Moreover, the relations were once again stronger for Whites. In fact, when SEM analyses that included all covariates were conducted separately for Blacks and Whites for all endogenous constructs, the R^2 terms for the covariate block were much higher for Whites (e.g., for W3 willingness, W3 drinking, and W4 drinking, respectively, the R^2 terms were .37, .27, and .29 for Whites vs. .20, .03, and .10 for Blacks). Thus, more of the variance in the endogenous and outcome constructs was explained by the covariates for the Whites than the Blacks. Nonetheless, the percentage of (remaining) variance explained by MAE was also much stronger for the Whites—again illustrating the strength of the exposure effect for them.

MAE effects, total sample—The final overall model also fit the data well: χ^2 (118, N = 4740) = 452.32; CFI =.99, TLI = .99, RMSEA = .024. As expected, there were direct MAE effects on all three endogenous constructs, plus W3 drinking (cf. Wills et al., 2009); and there was a direct path to W4 drinking (all positive, all ps < .001). The overall effect of MAE on W4 (i.e., Δ) drinking was significant: z = 12.27, p < .001, and the primary indirect path suggested by the prototype model (i.e., MAE → W3 prototype → W3 willingness → Δ drinking) was significant: z = 2.23, p < .03 (cf. Dal Cin et al., 2009). In short, MAE had an impact on adolescents' W3 drinking and change in their drinking from W3 to W4, and this latter effect was both direct and mediated by the effect of exposure on their cognitions.

Blacks vs. Whites—All of the paths that were significant for the overall sample were also significant for the White adolescents (all ps < .001). The indirect effect of MAE on W4 drinking through prototypes and willingness (i.e., the social reaction path from the prototype model) was significant for Whites: z = 2.70, p < .01; as was the path through W3 friends' use: z = 3.40, p < .001. A different pattern emerged for the Black adolescents, however: There were no significant paths from MAE to the W3 constructs or to W4 drinking (all ps > .10).

Black – White comparisons—Comparisons were examined by multigroup analysis, in which all paths and correlations for each group were first freely estimated and then a second model was run in which each path and correlation was constrained to be equal across the two groups. There were significant differences (Δ χ^2) for five paths and four correlations (see bolded paths in Fig. 2). Constraining these nine relations produced a significant change in χ^2: Δ χ^2 [9] = 181.9, p < .001, indicating that the fit to the data is much better when the two sets of relations are freely estimated in both groups. The final model with nine unconstrained paths / correlations fit the data: χ^2 (293, N = 4740) = 1053.7; CFI = .98; TLI = .97; RMSEA = .033. All four of the direct paths from MAE to T3 constructs were significantly stronger for Whites than Blacks: MAE to image, BW, drinking, and friends' drinking (all Δ χ^2 > 5.8, ps < .02). Also, as expected, the covariances between T3 friends' drinking and both T3 drinking and T3 BW were stronger for the Whites (all Δ χ^2 > 4.48, ps < .04).

Prototype influence—Finally, some additional, indirect evidence of social influence, or in this case, image influence, can be seen in the relations between the drinker prototype and willingness / behavior. The path from prototype to willingness was strong for both groups, but it was significantly stronger for the Whites (Δ χ^2 [1] = 5.82, p < .02). In addition, the covariance between drinker prototype and W3 drinking was also significantly stronger for the White participants (Δ χ^2 [1] = 21.1, p < .001).

Discussion

Media Influence on White Adolescents

MAE had a significant impact on the drinking behavior and cognitions of the White adolescents. Those who had seen more drinking in movies at W1 and W2[3] reported more favorable drinker prototypes and more willingness to drink at W3, and they reported more drinking at both W3 and W4. These exposure effects occurred even though they had seen the movies anywhere from 16 months to more than five years prior to W4. Moreover, the effects maintained when controlling for a number of individual difference factors that have been linked previously (and again in this data set) with drinking and prototype favorability,

[3]The pattern of results was almost identical when T3 MAE was added in to the MAE construct, so there was no evidence of a cumulative effect of exposure (after the first two waves).

and also with movie choice (e.g., sensation-seeking, rebelliousness, parent use; Dal Cin et al., 2009;Wills et al., 2009). This suggests that the observed effects, both cognitive and behavioral, were attributable to the alcohol exposure and not just the adolescents' dispositions or situations.

Process—Results of the SEM provide evidence of two different pathways of media influence for the White adolescents. The first, reflected in the direct paths from W1/W2 MAE to both W3 and W4 drinking, most likely involves modeling. Adolescents pay attention to the behaviors they see on TV and in movies and they learn from those behaviors (Bandura, 1986). The more drinking they see, for example, the more likely they are to learn how to drink and when to drink (Roberts & Foehr, 2004; Thomsen & Revke, 2006). These modeling effects do not necessarily involve (or require) changes in cognitions. The second pathway is indirect, and does involve cognitions, as well as affiliation. Seeing alcohol consumed by attractive actors and actresses leads to more favorable images of the type of person who drinks. This kind of increase in image favorability occurs anyway with age (Andrews & Peterson, 2006), but these results suggest that these increases occur earlier for those who have seen a lot of alcohol consumed in the media they have watched. These favorable images, in turn, are associated with more willingness to drink, and then more consumption.

Peers—Movie exposure was also positively (and prospectively) associated with reports of friends' drinking. There are several possible explanations for this effect. One is that the adolescents were viewing the movies with their friends and so the reports of friends' use are just further evidence of the overall impact of the movies—i.e., the adolescents *and* their friends were both affected by what they were viewing. Another possibility is that MAE was encouraging adolescents to seek out companions who were drinking—often referred to as a "selection" process (Hoffman et al., 2009; cf. Wills et al., 2007a; see below). Finally, it is possible that seeing alcohol in the movies made these adolescents more vulnerable to social influence from their friends—either intentional or incidental—a "socialization" process. These are not mutually exclusive accounts, of course, and it is likely that all three processes were occurring over the course of the study—but to different extents for the Black vs. the White adolescents.

Racial Differences in Social Influence

Movies—There was some evidence of movie influence for the Black adolescents. MAE was correlated with their risk cognitions, and with their behavior—more so at W4 than W3 (and more so among the older adolescents). But the SEM indicated that even though the Blacks saw a lot more alcohol in the movies they had watched than did the Whites, that exposure had very little impact on them. We believe there are two primary reasons for this. The first has to do with movies: there are far fewer Black actors in movies than White actors (Tanski, Stoolmiller, Gerrard, & Sargent, 2010). It may be the case that adolescents are more responsive to actors of the same-race or ethnic group (Tanski et al., 2010; cf. Dates, 1980; Nicholas, McCarter, & Heckel, 1971), just as they are to same-race models of any behavior (Martin & Bush, 2000). This possibility should be examined in future research.

Peers—Of course, the racial differences among actors does not explain racial differences in peer influence in our data. A more basic reason why Black adolescents showed less MAE response than White adolescents is that they appear to be less susceptible to social influence, in general, whether it comes from their peers, or other sources, such as the media. This tendency takes on additional meaning when considering that Black adolescents are likely to be living in environments in which substances are more available (LaVeist & Wallace, 2000) – and risk opportunity (e.g., substance availability) increases the relation between

willingness and behavior (Gibbons et al., 2004b) – *and* also that Black adolescents may be the targets of efforts by the alcohol and tobacco industries to increase use of their products (Alaniz, 1998; Chen et al., 2002; Schooler et al., 2005; Yerger & Malone, 2002). Thus, as others have claimed, there may be some utility in incorporating Black children's tendencies toward resistance into culturally-based education and preventive-intervention programs aimed at reducing substance use, especially if the program includes an ethnic-identity element (Yerger et al., 2005). In fact, we found a correlation between a measure of Black pride (Smith & Brookins, 1997) and resistance efficacy ($r = .31$, $p < .001$) in a different sample (Gibbons et al., 2010), which suggests that Black adolescents who more closely identify with Black culture may be even more capable of resisting social influence. For practical and theoretical reasons, this resistance-efficacy-as-buffer hypothesis vis a vis media influence appears to be worthy of future research, especially among Black adolescents.

Selection vs. socialization—Although there was less evidence of socialization among the Black adolescents, there appeared to be more evidence of selection for them, specifically, the lag from W3 (own) use to change in friends' use at W4 was stronger for them (see Figure 1). It could be that this was a particularly (socially) influential group of Black adolescents – i.e., they were influencing their peers' behavior – but we believe it is more likely that this relation is indicative of a selection process. Moreover, the relatively low (W3 to W4) stability for the Black adolescents' friends' use suggests that drinking may be less of a factor in their friendship maintenance (Hamm, 2000) than it is in their friendship choice. In other words, Black adolescents may choose friends whose behavior, including drinking, is similar to their own, but whether that relationship continues may have relatively little to do with shared drinking habits.

The Prototype Model

The indirect media effects appeared to follow the same mediation path to substance use as have peer influence effects in previous studies using the prototype model (Gibbons et al., 2006); i.e., through risk images and willingness to use. Given that children have access to R-rated movies at an early age and the fact that even PG and PG-13 rated movies include a fair amount of alcohol use (Dal Cin, Worth, Dalton, & Sargent, 2008; Dalton et al., 2002), it is not surprising that they have developed distinct risk images by age 7 (Andrews & Peterson, 2006). In this respect, the current results provide evidence of what some have suggested (e.g., Strasburger, 2006), which is that the media are an important source of risk image origination: the more alcohol adolescents see, the more likely they are to develop a favorable image of drinking and drinkers. At the same time, there is an upside to this apparent image malleability: if media can make risk images more favorable, then, presumably, it can also make them less favorable. This is encouraging from an intervention perspective-- i.e., interventions that include image modification (e.g., Blanton et al., 2001; Gerrard et al., 2006; Gibbons et al., 2005). Also, the fact that the risk images of the White adolescents were more strongly associated with their willingness suggests that the image → willingness relation, found in many previous studies (Gibbons et al., 2003), may also represent a kind of social influence process. Drinkers, for example, have some appeal for many adolescents, but whether that appeal translates into willingness depends to some extent on the adolescent's ability to resist influence. In other words, Black adolescents may acknowledge the appeal of risk images, but when the time comes, they are capable of resisting that internal urge, just as they resist (external) peer pressure. The possibility that the risk prototype → risk willingness relation may reflect a type of cognitive social influence process seems worthy of further attention within the domain of the prototype model.

Limitations

There are limitations in this research that should be noted. First, the sample began with more than five times as many White participants as Black, and the attrition rate was higher for the Blacks, which meant that a greater percentage of their data was imputed. Concern about the latter issue is reduced somewhat by the fact that attrition was not related to baseline drinking or MAE; and analyses suggested it did not contribute to the primary differences in MAE response. For example, variances were very similar across the two groups; and even though the relations among the Whites were consistently higher than those among the Blacks, the opposite was true for the own drinking to friend drinking path. Nonetheless, the differential subsample size is not ideal. Second, although we controlled for a large number of individual difference factors, there were only two contextual factors controlled, parent drinking and SES. There may be other such factors that contributed to the racial differences we found, such as the possibility that Black adolescents may have a less favorable image of substances and substance users because they have seen more of the negative consequences associated with use in their neighborhoods (Wallace, 1999). This may have contributed to the magnitude of the racial differences, but not to the differences in MAE effects. Alternatively, some have suggested that Blacks are less likely than Whites to report accurately on socially undesirable behaviors, such as substance use (but see a counterargument by Vaccaro & Wills, 1998). Once again, this could have contributed to the magnitude of racial differences, but is not a likely explanation for differences in the MAE effects. Third, reliabilities of two covariates were low: sensation seeking and rebelliousness (αs = .60 and .73), partly due to the small number of items. Finally, friends' drinking was reported by the target adolescent, not the friend. It is possible that Whites were more likely than Blacks to project their own drinking on to their friends (cf. Robinson et al., 2006). Future studies should include self- and friends' reports to further explore this issue.

Conclusion

We believe two conclusions about media effects can be drawn from these results. First, media influence resembles social influence in at least two ways: Both types of influence affect risk behavior primarily via the social reaction path (in the prototype model), and they both involve heuristic processing—processing that is image-based, relatively shallow, and socially-determined, and yet very powerful. Second, in spite of a number of elevated risk factors— including, perhaps, efforts by the tobacco and alcohol industries to target them—Black adolescents appear to be more resistant to social influence from peers and the media than are White adolescents.

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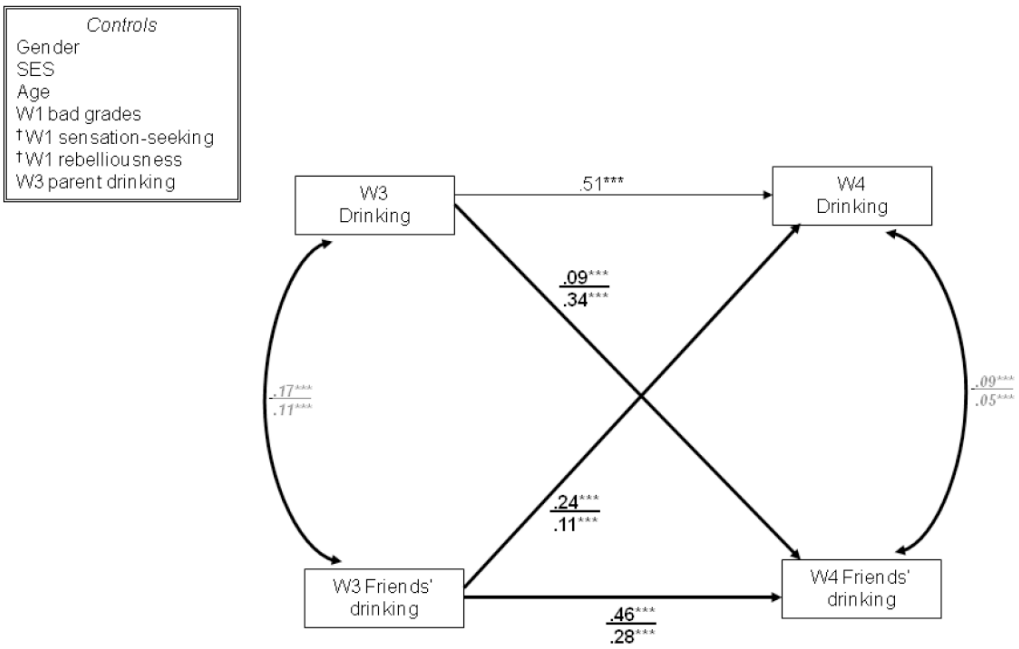

Figure 1.

Cross-lagged SEM (Blacks and Whites) for W3 and W4 Drinking and Friends' Drinking; Whites are above the line (n = 4036); Black are below the line (n = 704). Paths that are significantly different are shown in **bold**. Correlations are in *italics*. † latent control variables.* $p < .05$; ** $p < .01$; *** $p < .001$.

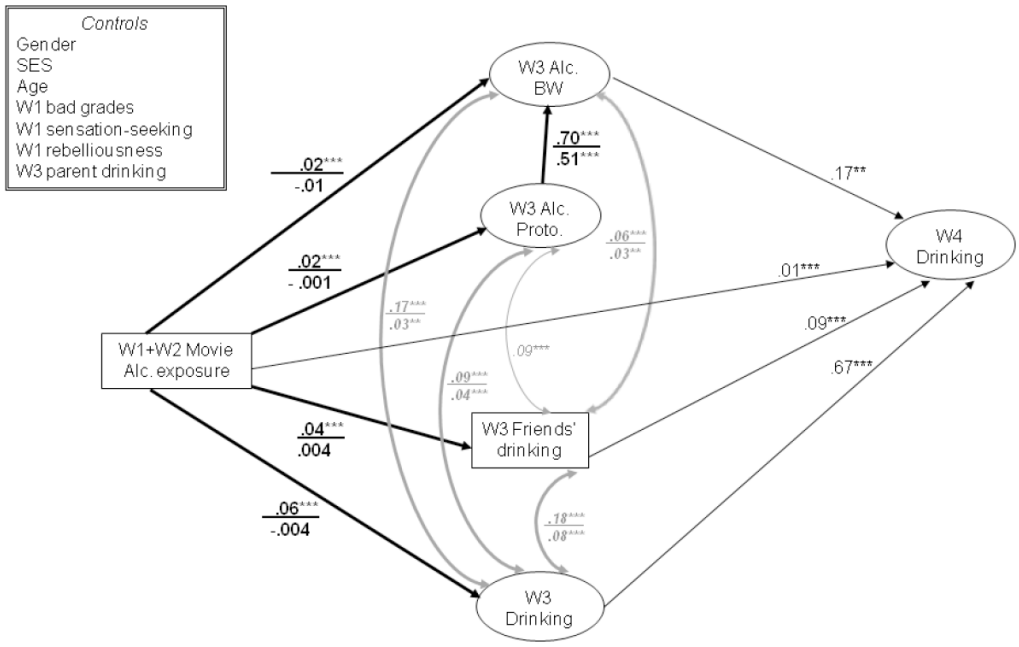

Figure 2.

Multigroup SEM (Blacks and Whites) for MAE Effects. Whites are above the line (n = 4036); Blacks are below the line (n = 704). Paths and covariances (in italics) that are significantly different are shown in **bold**. Covariances are in *italics*. Alc. = alcohol; BW = behavioral willingness; Proto. = alcohol prototype. † latent control variables.* p< .05; ** p < .01; *** p < .001.

Table 1

Attrition rates for Whites and Blacks

	N	White Attrition (Cum.)	*N*	Black Attrition (Cum.)	*N*	Total Attrition (Cum.)
Wave 1	4037		704		4741	
Wave 2	3537	12% (12%)	534	24% (24%)	4121	13% (13%)
Wave 3	3292	7% (18%)	454	15% (36%)	3746	9% (21%)
Wave 4	3070	7% (24%)	391	14% (44%)	3461	8% (27%)

Note. Attrition rate is based on the *N* from the prior wave; Cum. = Cumulative attrition rates (from Wave 1)

Table 2

Means, SDs, and Correlations for Primary Measures for Black and White adolescents

	MAE		W3 Proto		W3 BW		W3 Drinking		W3 Friend		W4 Drinking		W4 Friend	
	Whites	**Blacks**	**Whites**	**Blacks**	**Whites**	**Blacks**	**Whites**	**Blacks**	**Whites**	**Blacks**	**Whites**	**Blacks**	**Whites**	**Blacks**
Ms	10.29[a]	11.60	1.62	1.63	1.36[a]	1.26	0.05[a]	-0.18	1.54	1.49	0.07[a]	-0.21	1.63[b]	1.56
SDs	3.78	3.65	0.48	0.44	0.53	0.42	0.89	0.44	0.68	0.64	0.90	0.53	.72	.67
Skewness	0.13	-0.05	0.44	0.34	1.55	1.85	2.74	2.52	0.91	0.98	2.28	3.39	.67	.80
W3 Proto	.34	.14**												
W3 BW	.39	(.09)	.53	.31										
W3 Drinking	.36	.15**	.45	.36	.69	.36								
W3 Friend	.42	.19	.59	.43	.61	.29	**.57**	**.54**						
W4 Drinking	.39	.19	.42	.24	.62	.38	.68	.50	.55	.42				
W4 Friend	.44	.17	.55	.38	.53	.33	**.49**	**.45**	.68	.50	.59	.44		

Note. Means and SDs are multiply imputed, such that $n = 4036$ for Whites and 704 for Blacks. Correlations are computed with pair-wise deletion. Parentheses indicate a non-significant correlation;

** $p \leq .01$; all other *r*s significant at $p \leq .001$.

Bolded pairs of correlations indicate non-significant differences between correlations for Blacks and Whites; all other Black/White pairs of correlations are significantly different. Superscripts indicate significant mean difference between Whites and Blacks:

[a] $p \leq .001$,

[b] $p \leq .05$.

MAE = Movie alcohol exposure, Proto = Alcohol Prototype, BW = Behavioral Willingness to drink alcohol, Use = standardized measure of self-report of drinking, Friend = Friends' drinking.

Table 3

Correlations of Covariates with Primary Endogenous Variables by Race

	Gender		SES		Age		T1Bad Grades		T1Sensation		T1Rebellious		T3 Parental Use	
	Whites	**Blacks**	**Whites**	**Blacks**	**Whites**	**Blacks**	**Whites**	**Blacks**	**Whites**	**Blacks**	**Whites**	**Blacks**	**Whites**	**Blacks**
1. W3 Friend	(.01)	(.07)	-.07	(.03)	.53	.43	.17	(.01)	.36	.17	.27	.16**	.14	.12*
2. W3 Proto	(.03)	(.06)	(.02)	.11*	.48	.32	.10	(.05)	.27	.12*	.18	.11*	.16	.13**
3. W3 BW	-.06**	(.07)	-.05**	(.01)	.36	.11*	.18	(.00)	.36	.22	.31	.10*	.19	(.05)
4. W3 Use	(-.03)	(.05)	-.05**	(-.04)	.31	.27	.17	(.03)	.31	.15**	.29	.10*	.14	.12*
5. W4 Use	(-.03)	(.02)	-.04*	(.03)	.31	.22	.16	(.01)	.32	.20	.28	.14**	.19	.14**
*M*s	.49	.51	1.29[a]	.82	12.06	12.00	1.93[a]	2.10	1.98	2.01	1.34[a]	1.45	1.74[a]	1.18
*SD*s	NA	NA	.61	.68	1.39	1.43	.81	.83	.61	.60	.45	.50	1.26	1.23

Note.

*Ms and SDs are multiply imputed, such that n = 4036 for Whites and 704 for Blacks. Correlations are computed with pair-wise deletion. Parentheses indicate a non-significant correlation;

*$p < .05$;

**$p \leq .01$; all other rs significant at $p \leq .001$.

Gender: 0 = male; 1 = female. Bad grades: higher scores mean worse grades.

[a]Superscripts indicate significant mean difference between Whites and Blacks at $p < .001$.