

The Impact of Media-Related Cognitions on Children's Substance Use Outcomes in the Context of Parental and Peer Substance Use

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Abstract:

Media-related cognitions are a unique influence on adolescents' substance use outcomes even after accounting for the powerful influence of parent and peers. This cross-sectional study expands upon prior research by investigating the impact of media-related cognitions on children's alcohol and tobacco outcomes in the context of parental and peer substance use. Six hundred forty-nine elementary school children ($M = 9.4$ years of age, $SD = 1.1$ years; 51 % female) completed self-report questionnaires. After accounting for peer and parental substance use, children's media-related cognitions were independently associated with three outcomes: preferences for alcohol-branded merchandise, moral beliefs about underage alcohol and tobacco use, and intentions to use alcohol and tobacco. Children's perceptions of the desirability and realism of alcohol and tobacco ads—and their similarity to and identification with these ads—predicted greater intentions to use. Desirability and identification with alcohol and tobacco ads were associated with stronger preferences for alcohol-branded merchandise, and understanding advertising's persuasive intent predicted weaker preferences. Media deconstruction skills predicted stronger beliefs that underage alcohol and tobacco use is wrong. Peer and parental substance use were associated with stronger substance-use intentions among children and weaker feelings that substance use is wrong. The findings highlight the role of media influence in contributing to youth substance use and the potential role of media literacy education in the early prevention of substance use.

Keywords: Alcohol | Tobacco | Children | Media | Critical thinking | Elementary school | Parents | Peers

Article:

Introduction

Almost one in five children have tried or experimented with alcohol or tobacco (CDC 2012; Kaplow et al. 2002). One study found that as young as third, fourth, and fifth grade, 18 % of students had already tried alcohol or tobacco (Kupersmidt et al. 2010). Nationally representative

data indicate that 6.1 % of eighth graders had tried a cigarette by age 11 (Johnston et al. 2012), and 20.5 % of high school students had their first alcoholic drink by age 13 (CDC 2012). Early use and abuse of alcohol and tobacco is related to numerous negative outcomes including damage to the developing brain (Brown et al. 2000), dependency (Wilson et al. 2002), delinquency (Ellickson et al. 2003), and decreased potential for academic and career success (Gruber et al. 1996). Despite the serious consequences of childhood substance use, less is known about etiological factors associated with early onset and substance use related cognitions in childhood as compared to adolescence. Many individual, interpersonal, social, and environmental factors may be involved.

An ecological perspective (Bronfenbrenner 1979) provides a useful framework for considering the multiple, simultaneous influences on children's substance use behaviors. According to this perspective, children develop in a multilayered context with influences—including community, organizational, and interpersonal or individual factors—at different levels. Often, these different levels of influence are termed as being part of the microsystem (e.g., personal, peer, parents) or macrosystem (e.g., media, culture). Both concurrent and longitudinal studies have demonstrated that proximal, microsystem-level influences directly affect substance use behaviors among youth (Hoffman et al. 2006; Trucco et al. 2011). Bronfenbrenner's ecological model also considers the more distal, macrosystem level factors that influence children's behavior. For example, children and adolescents exist in a media-rich environment, which sends powerful messages regarding social norms. Less is known about the role of media influences on children's substance use beliefs and behaviors as compared with microsystem influences, like parents or peers. Promising research on adolescents has established that media influence measures are related uniquely to adolescents' current substance use and intentions to use substances in the future, even after controlling for peer and parent influences (Scull et al. 2010). The current study builds on that work by replicating the research design and methods with younger children, examining the role of media-related cognitions on substance use outcomes in the context of both peer and parental substance use influence.

Peer and parental influences

Among the many individual, interpersonal, social, and environmental influences on youth substance use, parents and peers have received perhaps the most attention (Elkington et al. 2011; Hoffman et al. 2006). Peer influence, both active (e.g., peer pressure, peers offering substances) and passive (e.g., perceived norms, social modeling), is one of the strongest predictors of current and future substance use (Ferguson and Meehan 2011). According to classic peer cluster theory, peer groups comprised of youth who are using substances may share information, attitudes, values, and norms about drug use, thus creating a social context for substance use (Oetting and Beauvais 1986).

Parental influence has been identified as another important risk factor for early substance use initiation. Parents can affect their children's substance use both by their parenting practices and by modeling either positive or negative substance use behaviors (Kung and Farrell 2000; Johnson and Johnson 2001). Parents' substance use is associated with initiation of substance use among adolescents (Cranford et al. 2010; Buu et al. 2009). Further, having a parent who abuses substances or suffers from alcoholism predicts early initiation of substance use (Zucker et al. 2008).

Media Influences

In addition to the role of parents and peers, recent attention has focused on the role of mass media in shaping youth substance use (Strasburger and The Council on Communications and Media 2010). Children and adolescents exist in a media-rich environment and receive persuasive messages about substance-related social norms and outcome expectancies. The media's ability to influence youth's behaviors is not surprising considering the amount of media to which children are exposed. US children and adolescents spend over 7.5 h a day using media on average, with rates exceeding 10 h per day when considering the use of more than one form of media simultaneously (Rideout et al. 2010).

Media messages are the norms, ideas, and information that mass media communicate to the public. Media messages can be categorized as being either direct or indirect. Direct media messages about substance use include advertisements, which are designed to convince people to buy or try alcohol or tobacco products. Although alcohol and tobacco products are illegal for youth to purchase, children and adolescents are overexposed to direct advertising for these products. Despite voluntary alcohol-industry guidelines about advertising on television, youth exposure to alcohol advertising on US television increased 71 % between 2001 and 2009 (Center on Alcohol Marketing and Youth 2012). With regard to cigarette advertising, despite longstanding restrictions on cigarette advertising in some media (such as television and radio), the three most heavily advertised brands of cigarettes account for 81 % of the brand market share among youth smokers 12–17 years old (SAMHSA 2007).

Not only are youth exposed to direct marketing of alcohol and tobacco, but media also indirectly promote alcohol and tobacco use. Indirect media messages about substances include more subtle suggestions about the pros or cons of substance use. They may include product placement, images of use, and mention of substance use themes in dialogue, plot, or lyrics. For example, an estimated 81 % of youth have been exposed to images of tobacco use in movies and television (Duke et al. 2009). Further, content analysis reveals that the smoking rates in movies are not indicative of normative smoking rates (Glantz et al. 2004). Smoking appeared in movies at a rate of 10.7 smoking incidents per hour of film time in the 1950s and then dropped to 4.9 incidents in the 1980s. By 2002, the rate of smoking incidents per hour of film jumped back up to 10.9—despite a smoking rate among US adults in the 2000s half that seen in the 1950s (Glantz et al. 2004). With regard to alcohol use, another content analysis of movies found that 92 % of contemporary movies contained depictions of alcohol use; even among G-rated films, 52 % contained depictions of alcohol use (Sargent et al. 2006). Across the last two decades, the proportion of popular music that contains substance use messages has dramatically increased (Christenson et al. 2012). Youth are exposed to an estimated 84 references to substance use in popular music daily; the majority of the messages portray substance use in a positive light (Primack et al. 2008).

Current Study

Media messages about alcohol and tobacco are effective in guiding youth beliefs, attitudes, and behaviors (Strasburger et al. 2009; Zucker et al. 2008). Several research studies provide evidence for an association between exposure to alcohol use in media messages and drinking onset (Dal Cin et al. 2009; Hanewinkel et al. 2008; Collins et al. 2007) and exposure to smoking in media messages and smoking onset (Shmueli et al. 2010; Sargent et al. 2007). For example, middle

school students who reported greater exposure to alcohol advertising were significantly more likely to drink alcohol in high school than those who reported less exposure (Ellickson et al. 2005). Another study showed youth who viewed more than 5 h of television per day were nearly six times as likely to begin smoking as youth who viewed less than 2 h a day (Gidwani et al. 2002).

Information processing theory and studies have examined the cognitive mechanisms that explain media influence, or the ways in which media messages contribute to intentions and behavior. The most common conceptual framework used to explain media influence is the Message Interpretation Process (MIP) model (Austin and Johnson 1997a, b; Austin and Meili 1994). According to the MIP model, media messages are processed both logically and emotionally. Through the logical pathway, individuals internalize media messages based on how realistic the media message seems (i.e., perceived realism) and the extent to which the media message represents the individual's own life experiences (i.e., perceived similarity). Through the emotional pathway, individuals evaluate the attractiveness of the media message (i.e., perceived desirability). These three mediators work together to determine the degree to which the viewer identifies with, or wishes to emulate, the behaviors endorsed in the media message. Identification has been shown to contribute to substance use interest and behavior in children and adolescents (Austin et al. 2006).

The MIP model has guided recent research about parental, peer, and media influences on adolescents' alcohol and tobacco use outcomes. Scull et al. (2010) found that measures of media influence were related uniquely to adolescents' current substance use and intentions to use substances in the future, even after controlling for peer and parent influences. In combination with the evidence about media exposure and youth substance use, the findings about media influence contribute to a growing concern about negative consequences of youth's engagement with and ability to process unhealthy media messages.

However, there is reason to believe that media may affect children's substance-related attitudes, beliefs, and behaviors differently from those of adolescents. Although children are also highly engaged with the media, media messages may not be as influential as for adolescents. Children's access to unhealthy media messages may be more limited than during adolescence due to parental restrictive mediation of media (e.g., limiting the amount of media exposure and/or restricting certain content) and federal law, which restricts some adult content in television and radio broadcasts to late night hours, presumably when children are sleeping. Seemingly, children may be exposed to a different media landscape than adolescents. In addition, children are more compliant, rule-governed, and adult-focused than adolescents, who developmentally are establishing their independence and are influenced strongly by their peers and media. Few empirical studies have examined the role of media messages in affecting attitudes and beliefs about substance use among children.

This study aims to fill a gap in research regarding the influence of media on substance use among youth. Specifically, it investigates the influences of parents, peers, and mass media on elementary school students' substance use-related cognitions. Following the MIP model, measures of media influence in the current study center on realism, similarity, desirability, and identification. In addition, in an effort to understand how both emotional and logical pathways of message processing can be changed, this study also examines three other media-related cognitions: children's understanding of the persuasive intent behind media messages, media skepticism, and media deconstruction skills. The main goal of the study is to examine the unique

influence of media-related cognitions on three substance use-related outcomes: children's preferences for alcohol-branded merchandise (e.g., toys, clothes, or other objects with alcohol logos), moral beliefs about underage alcohol and tobacco use, and intentions to use alcohol and tobacco in the future. In each case, these analyses are conducted controlling for parental and peer substance use influences. These outcomes were selected to be relevant and developmentally appropriate for children, because directly measuring children's use of alcohol or tobacco products may not yield significant variability. Interest in alcohol-branded merchandise is commonly used as a pre-drinking intention measure because youth ownership of such items correlates with the initiation of adolescent drinking (McClure et al. 2006) and risky behavior (Austin and Knaus 2000). Youth are commonly asked to report on their beliefs about substance use, and alcohol belief measures show excellent convergent validity and are highly predictive of drinking, heavy drinking, and drinking intentions among youth (e.g., Hampson et al. 2006; Trafimow et al. 2002). Drawing on the theory of reasoned action (Ajzen and Fishbein 1980), intention to use a substance is the most proximal cognition to substance use and consistently predicts actual use in both concurrent and longitudinal studies (Barnea et al. 1992; Hawkins et al. 1992).

This study's hypotheses are based on the Message Interpretation Process model and prior research on alcohol and tobacco use among adolescents. Consistent with prior research on adolescents, parent and peer influences are hypothesized to be related significantly to children's beliefs and intentions about substance use. In addition, media influences are expected to predict substance use outcomes significantly above and beyond the variance accounted for by peer and parent influences. Specifically, consistent with the MIP model, realism, desirability, and similarity are expected to be related negatively to the belief that substance use is wrong and positively to preferences for alcohol-branded merchandise and intentions to use substances in the future. Conversely, we expect that understanding of persuasive intent, media skepticism, and media deconstruction skills will be related positively to the belief that substance use is wrong and negatively to preferences for alcohol-branded merchandise and intentions to use substances in the future.

Method

Participants

The data were collected as part of an evaluation of a theory based 3rd–5th grade, media literacy education, substance use prevention program in schools. Children sampled were from 49 classrooms in 12 elementary schools that drew students from urban, suburban, and rural populations in the southeastern US. In total, 649 out of 1,021 children had complete data and were included in the final sample for analysis. Participating children ranged in age from 7 to 13 years ($M = 9.40$, $SD = 1.14$), 46 % were in 3rd grade, 20 % were in 4th grade, 34 % were in 5th grade, and 51 % were female.

Procedure

Child participants were asked to complete two questionnaires approximately 2 weeks apart that assessed their attitudes, behavioral intentions, and cognitions surrounding parents, peers, media, and substance use. A week prior to the questionnaire administration, project staff distributed

permission forms to each participating class of students to bring home to their parents or guardians. Children who returned signed parent permission forms indicating parent approval for their child's participation were eligible to participate. The average parental consent rate was 75 %. Prior to completing study questionnaires, children with parent permission were read an assent form by the lead data collectors and asked to give written assent to complete the paper-and-pencil questionnaires during the class period. Among children receiving parental permission to participate, 96 % of children assented to participate. All data used in the analyses in this article were derived from the first questionnaire administered prior to the participation in the media literacy education program with the exception of the peer and parental substance use items. In the second questionnaire, children reported how many of their friends use alcohol or tobacco and how frequently in the past year their mother and father have used alcohol and tobacco products. Children in the intervention group received a media literacy education program in between the two time points, but the program did not address parent or peer usage or topics.

Measures

Demographic Characteristics

Demographic information collected includes children's age, grade, and sex.

Previous Substance Use

Previous use of alcohol and tobacco is assessed using two standard items (e.g., Monitoring the Future: Johnston et al. 2012): "How many times (if any) in your lifetime have you had an alcoholic drink—more than just a few sips?" and "How many times (if any) in your lifetime have you used a tobacco product (like smoking part of all of a cigarette, cigar, or pipe or using chewing tobacco or snuff)?"

Outcome Measures

Preference for Alcohol-Branded Merchandise Six items measure student interest in alcohol-branded merchandise as compared to similar items with a soda product theme (e.g., Corona toy plane vs. Sprite toy plane); $\alpha = .81$ (Austin et al. 2006). For each question, two pictures of items, one alcohol-themed and one soda-themed, are presented (counterbalancing for labels A and B). Students respond on a five-point scale from 1 (I like B a lot more) to 5 (I like A a lot more). Higher mean scores indicate preference for alcohol-branded merchandise.

Moral Beliefs About Underage Alcohol and Tobacco Use Two items assess children's moral beliefs about underage alcohol and tobacco use: "How wrong do you think it is for someone your age to...drink alcohol (beer, wine, or liquor)?" and "...smoke cigarettes?" Responses range from 0 (Not wrong at all) to 3 (Very wrong), and the alpha reliability of the measure is $\alpha = .76$.

Intentions to Use Alcohol and Tobacco Eight items assess children's intentions to use alcohol and tobacco in the future on a scale ranging from 0 (I definitely will not) to 4 (I definitely will), with prompts for use before legal age (age 21 for alcohol, 18 for tobacco) and for use during the

next year ($\alpha = .85$) (Kupersmidt et al. 2010).

Peer and Parental Influence Measures

Peer Substance Use A modified version of the Peer Substance Use measure was administered (Scull et al. 2010). Two items measure children's perceptions of peer use of alcohol and tobacco: "How many of your friends...use tobacco?" and "...drink alcohol?" Responses range from 0 (None) to 4 (Almost all), and the alpha reliability is $\alpha = .82$.

Parental Substance Use Four items assess children's perceptions of how often their parents drank alcohol or used tobacco during the past year, with separate questions for mother or female guardian and father or male guardian. Responses range from 0 (Never) to 4 (Daily), and a "Can't answer" option is also available ($\alpha = .67$; Scull et al. 2010).

Media Influence Measures

Media influence variables representing MIP constructs are adapted from Austin and Johnson (1997a, b). Mean scale scores are created by averaging respondents' scores across the relevant items. Responses for scale scores range from 0 (Never) to 5 (Always).

Desirability of Alcohol and Tobacco Ads Three items measure the degree to which children find the people and things in alcohol and tobacco advertisements attractive: "I like the way people look in beer and cigarette ads," "I like the things that people do in beer and cigarette ads," and "I like the things that happen in beer and cigarette ads." The alpha reliability for this measure is $\alpha = .76$.

Realism of Alcohol and Tobacco Ads Six items ask about the degree to which alcohol and tobacco ads are like real life. Participants respond to how often "People in cigarette ads...do things that real smokers do," "...look like real smokers," "...act like most people act when they smoke," and to how often "People in beer ads...do things that most people do when they drink beer," "...look like real beer drinkers," and "...act like most people act when they drink beer." The alpha reliability for this measure is $\alpha = .91$.

Similarity to Alcohol and Tobacco Ads Four items ask how often the people and things that appear in alcohol and tobacco ads are similar to children's personal experiences. Questions include: "I like the kinds of things that people in beer ads like," "I like the kinds of things that people in cigarette ads like," "People I know are like the people I see in beer ads," and "People I know are like the people I see in cigarette ads." The alpha reliability for this measure is $\alpha = .71$.

Identification with Alcohol and Tobacco Ads Six items measure the degree to which children want to be like the people portrayed in alcohol and tobacco advertisements. Children rate "How much fun would it be to...do the things that people in beer ads do," "...look like the people I see in beer ads," "...be like people in beer ads," "...do the things that people in cigarette ads do," "...look like the people I see in cigarette ads," and "...be like people in cigarette ads." The alpha reliability for this measure is $\alpha = .89$.

Understanding of Persuasive Intent of Advertising Three items measure students' understanding of advertising's persuasive intent: "How often is this true... advertisers want you to buy the product even if it isn't good for you to have," "...advertisers care more about making money than about what is good for you," and "...advertising doesn't change the way I think." The alpha reliability for this measure is $\alpha = .66$.

Media Skepticism Six items assess skepticism of alcohol and tobacco advertising: "Beer ads make drinking seem better than it really is," "Cigarette ads make smoking seem better than it really is," "Beer advertisers try to take advantage of teens," "Cigarette advertisers try to take advantage of teens," "Beer ads are honest about what happens when people drink beer," and, "Cigarette ads are honest about what happens when people smoke cigarettes." The alpha reliability for this measure is $\alpha = .69$.

Deconstruction Skills To measure critical thinking about advertisements, participants complete a performance-based task involving an open-ended deconstruction of an alcohol print advertisement, which is qualitatively scored for analysis of the product, target audience, purpose, ad hook, hidden message, missing information, and visual elements (Kupersmidt et al. 2010). Total deconstruction scores are the average of each of three trained coders' scores for that individual (range 0–16). The alpha reliability for this measure is $\alpha = .94$.

Results

Overview of the Analyses

This study includes responses from children clustered in classrooms within public schools in one region of the southeastern US. Despite the nested structure of the data, mixed model analyses are not used due to small, anticipated between-school variance on the study variables.

To handle the low proportion of missing data (less than 9 % missing for all study variables), the analyses use multiple imputation (EM algorithm, $m = 20$). Bivariate correlations are calculated between all the variables. Then, three ordered multinomial logistic regressions are conducted, one for each outcome of interest: (1) preferences for alcohol-branded merchandise, (2) moral beliefs about the underage use of alcohol and tobacco, and (3) intention to use alcohol and tobacco. The regression models include demographic, previous use, parental substance use, peer substance use, and media influence variables. The models include effects for items and subjects, with standard errors adjusted for multiple observations per subject. Post hoc tests are used to determine whether the block of media influence variables as a group predicts a unique amount of variance in each outcome, over and above the variance accounted for by demographic characteristics, peer substance use, and parental substance use.

Descriptive and Bivariate Results

Table 1 shows descriptive statistics for the outcomes and key independent variables of the study. Bivariate correlations are calculated for the three outcome variables, peer and parental substance use, and media influence variables (see Table 2). Intentions to use alcohol and tobacco is positively related to preferences for alcohol-branded merchandise ($r = .25, p < .0001$) and negatively related to moral beliefs that underage alcohol and tobacco use is wrong ($r = -.41,$

p\,0001). Moral beliefs that underage alcohol and tobacco use is wrong are also negatively related to preferences for alcohol-branded merchandise ($r = -.15, p\,0001$). Among the influence variables, the interscale correlations range from a low of $-.01$ (peer substance use and understanding of persuasive intent of advertising) to a high of $.50$ (desirability and identification). The average interscale correlation is $.14$. These results suggest that the predictor and outcome variables, although associated, can be examined uniquely.

| Variable | <i>M</i> | <i>SD</i> | Range |
|--|----------|-----------|-------|
| Outcomes | | | |
| Preference for alcohol-branded merchandise | 1.63 | 0.79 | 1–5 |
| Moral beliefs about underage use | 2.88 | 0.41 | 0–3 |
| Intentions to use alcohol or tobacco | 0.16 | 0.32 | 0–2.5 |
| Previous substance use | | | |
| Previous use of alcohol | 0.54 | 2.63 | 0–44 |
| Previous use of tobacco | 0.14 | 0.98 | 0–19 |
| Peer influence | | | |
| Peer substance use | 0.11 | 0.47 | 0–4 |
| Parental influence | | | |
| Parental substance use | 0.80 | 0.96 | 0–4 |
| Media influence | | | |
| Desirability | 0.21 | 0.54 | 0–5 |
| Realism | 2.63 | 1.36 | 0–5 |
| Similarity | 0.52 | 0.71 | 0–5 |
| Identification | 0.10 | 0.33 | 0–5 |
| Persuasive intent | 3.06 | 1.41 | 0–5 |
| Media skepticism | 3.39 | 0.87 | 0–5 |
| Deconstruction skills | 4.65 | 2.34 | 0–12 |

Table 1 Mean scores, standard deviations, and ranges for continuous outcome, demographic, peer influence, parental influence, and media influence variables ($n = 650$)

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|------------------------------|------|--------|--------|--------|--------|--------|-------|--------|--------|--------|-------|--------|
| Intentions to use | 1.00 | -.41** | .25** | .24** | .19** | .37** | .08* | .28** | .34** | -.06 | -.06 | -.06 |
| Moral beliefs | | 1.00 | -.15** | -.27** | -.16** | -.25** | -.04 | -.17** | -.21** | .06 | .01 | .07 |
| Pref. for alc-branded merch. | | | 1.00 | .05 | -.02 | .18** | -.05 | .00 | .19** | -.22** | -.10* | -.15** |
| Peer substance use | | | | 1.00 | .19** | .13** | .08 | .15** | .25** | -.01 | -.02 | -.06 |
| Parental substance use | | | | | 1.00 | .08 | .04 | .13* | .12* | .07 | .05 | .12* |
| Desirability | | | | | | 1.00 | -.11* | .22** | .50** | .06 | .05 | .12* |
| Realism | | | | | | | 1.00 | .20** | -.05 | .07 | .01 | -.13* |
| Similarity | | | | | | | | 1.00 | .29** | -.02 | -.07 | -.02 |
| Identification | | | | | | | | | 1.00 | -.03 | .02 | .08* |
| Persuasive intent | | | | | | | | | | 1.00 | .46** | .40** |
| Media skepticism | | | | | | | | | | | 1.00 | .48** |
| Deconstruction | | | | | | | | | | | | 1.00 |

$n = 650$; * $p < .05$; ** $p < .001$

Table 2 Correlation matrix for all outcome and influence variables

Multivariate Results: Preferences for Alcohol-Branded Merchandise

Results of multivariate analyses are shown in Table 3. Analyses reveal that inclusion of all the variables in the model accounts for a significant amount of the variance in children's preference for alcohol-branded merchandise, $F(13, 27,661) = 17.30, p \leq .0001$. Previous use of alcohol, perceived desirability of alcohol and tobacco ads, and identification with alcohol and tobacco ads are each associated with stronger preferences for alcohol-branded merchandise. Older age, perceived similarity to alcohol and tobacco ads, and understanding of persuasive intent are associated with lower preferences for alcohol-branded merchandise. The influence variables that comprise the media block (i.e., desirability, realism, similarity, identification, understanding of persuasive intent, media skepticism, and deconstruction skills) predict a significant amount of variance (11.3 %) in preferences for alcohol branded merchandise over and above the demographic, previous use, peer, and parental variables, $F(7, 12,146) = 19.80, p \leq .0001$.

| Variable | Preference for alcohol-branded merchandise | | Moral beliefs | | Intentions to use | |
|-------------------------------|--|------|---------------|------|-------------------|------|
| | <i>b</i> | SE | <i>b</i> | SE | <i>b</i> | SE |
| Demographics | | | | | | |
| Age | -0.24*** | 0.04 | -0.39*** | 0.11 | 0.01 | 0.05 |
| Sex ^a | -0.14 | 0.07 | -0.03 | 0.24 | -0.46*** | 0.10 |
| Previous substance use | | | | | | |
| Previous alcohol use | 0.04*** | 0.01 | -0.07* | 0.03 | 0.06*** | 0.01 |
| Previous tobacco use | -0.03 | 0.04 | -0.12* | 0.06 | 0.19*** | 0.03 |
| Peer influence | | | | | | |
| Peer substance use | 0.00 | 0.08 | -0.40* | 0.16 | 0.23** | 0.08 |
| Parental influence | | | | | | |
| Parental substance use | -0.08 | 0.05 | -0.27* | 0.11 | 0.20*** | 0.05 |
| Media influence | | | | | | |
| Desirability | 0.43*** | 0.07 | -0.63*** | 0.16 | 0.67*** | 0.08 |
| Realism | -0.05 | 0.03 | -0.08 | 0.10 | 0.08* | 0.04 |
| Similarity | -0.14* | 0.06 | -0.26 | 0.14 | 0.38*** | 0.06 |
| Identification | 0.48*** | 0.13 | -0.44 | 0.25 | 0.35* | 0.13 |
| Persuasive intent | -0.20*** | 0.03 | 0.13 | 0.09 | -0.02 | 0.04 |
| Media skepticism | 0.06 | 0.05 | 0.01 | 0.16 | -0.14* | 0.07 |
| Deconstruction skills | 0.00 | 0.02 | 0.15** | 0.06 | -0.04 | 0.03 |

* $p < .05$; ** $p < .01$; *** $p < .001$

^a Reference group is male

Table 3 Demographic characteristics, peer influence, parental influence, and media influences predicting children's substance use cognitions and behavioral intentions (n = 650)

Multivariate Results: Moral Beliefs About Underage Alcohol and Tobacco Use

For children's moral beliefs about underage substance use, inclusion of all the variables in the model accounts for a significant amount of the variance, $F(13, 1.01E6) = 9.02, p < .0001$. Specifically, having more advanced media deconstruction skills is related to stronger beliefs that underage alcohol and tobacco use is wrong. Previous use of alcohol, previous use of tobacco, older age, having peers who more often use alcohol and tobacco, having parents who more often use alcohol and tobacco, and perceived desirability of alcohol and tobacco ads predict weaker

beliefs that underage alcohol and tobacco use is wrong. The block of media influence variables predicts a significant amount of variance (2 %) in moral beliefs over and above the demographic, previous use, peer, and parental variables, $F(7, 327,912) = 7.52, p < .0001$.

Multivariate Result: Intention to Use Alcohol and Tobacco

Finally, for children's intentions to use alcohol and tobacco, inclusion of all the variables in the model accounts for a significant amount of the variance, $F(13, 17,775) = 34.05, p < .0001$. Factors related to higher substance use intentions are previous use of alcohol, previous use of tobacco, being male, having peers who more often use alcohol and tobacco, having parents who more often use alcohol and tobacco, increased perceptions of the desirability and realism of alcohol and tobacco ads, and perceived similarity to and identification with alcohol and tobacco ads. Media skepticism predicts lower substance use intentions. The block of media influence variables predicts a significant amount of variance (8.6 %) in intentions over and above the demographic, previous use, peer, and parental variables, $F(7, 20,079) = 32.03, p < .0001$.

Discussion

Parents and peers are acknowledged influences on adolescents' substance use behaviors. Recently, research has revealed that media influence is also a unique etiological factor associated with the early onset of substance use behaviors (Scull et al. 2010). However, few empirical studies have examined the role of media messages in affecting attitudes and beliefs about substance use prior to adolescence. Therefore, this study examines children's substance use-related cognitions in the context of parent, peer, and media influence. Consistent with the research on adolescents, media-related cognitions in childhood significantly predict children's substance use-related cognitions including intent to use, preferences for alcohol-branded merchandise, and moral beliefs about substance use even after controlling for peer and parental substance use. Despite the fact that media influence remains a powerful predictor of substance use cognitions in childhood, these media-related cognitions are malleable, and change in these cognitions are associated with positive health outcomes (Kupersmidt et al. 2010, 2012). This pattern of findings suggests that media messages are among the group of factors that influence children's future substance use behaviors.

The results provide evidence consistent with many research studies that have illustrated the influential role that peer and parental substance use plays in youth's decisions to experiment with alcohol and tobacco. In the current study, having friends and parents who use substances is predictive of weaker beliefs that substance use is wrong for a child their age and stronger intentions to use substances in the future. Further research should continue to consider peer and parental substance use as a risk factor for youth substance use and control for these influences to determine the unique contribution of other influence variables.

The results also identify media-related risk factors that may contribute to substance use. Consistent with prior research on the MIP model (Austin and Johnson 1997a, b), desirability, realism, similarity, and identification predict more intention to use alcohol and tobacco. Increases in each of these media-related cognitions are related to increases in intentions to use substances. Desirability also predicts weaker beliefs that alcohol and tobacco use is wrong for children. Both desirability and identification predict more interest in alcohol-branded

merchandise—a pre-drinking measure correlated with the onset of alcohol experimentation (McClure et al. 2006). These results provide support for the MIP model’s hypothesized pathways through which alcohol and tobacco advertising—containing dangerously positive messaging about the uses and gratifications of the products—can lead to future substance use.

One unexpected finding emerged. Children’s reports of similarity to media messages were not consistently related to outcomes in the hypothesized directions. Specifically, the less children reported being similar to people and messages in alcohol and tobacco advertising the more interested they were in alcohol-branded merchandise, but the less they intended to use alcohol or tobacco products. The lack of consistency in findings related to this construct may suggest that this scale needs further development for use with children.

This study also suggests cognitive assets that may protect children against potentially negative influences of alcohol and tobacco advertising. First, understanding the persuasive intent of advertising is associated with less preference for alcohol-branded merchandise. In addition, media skepticism predicts lower intentions to use alcohol and tobacco. More advanced media deconstruction skills also predict stronger beliefs that alcohol and tobacco use is wrong. In the context of the MIP model, media skepticism, or questioning the reality portrayed in the mass media, is theorized to increase awareness of advertising techniques and thereby decrease susceptibility to these techniques (Austin et al. 2006). Similarly, individuals with critical thinking skills—as evidenced by their understanding of the persuasive intent of advertising and their skills in deconstructing advertising—are less likely to be affected by strong emotional appeals found in advertising. For example, a youth with media deconstruction skills might look at an alcohol advertisement and find the models to be attractive and popular. However, he or she will realize the implausibility of the message and the purpose of the advertising, and reject the ad’s message that alcohol has positive consequence and instead consider the negative consequences.

Media may be a powerful way to shape children’s perspectives about what is considered normative behavior for them now and as they transition into adolescence, but the relative importance of the media in light of other interpersonal influences has remained a question. The present findings concur, replicate and extend findings suggesting that not only are media influences not inconsequential, but remain important within a broader developmental context. Consequently, the influence of media messages on children’s substance use behaviors may not be mitigated by preventive interventions that focus solely on peers and/or parents.

The findings of this study should be considered in light of a number of limitations. First, the cross-sectional design limits the ability to determine causality. The analyses treat parent, peer, and media-related cognitions as affecting children’s substance use outcomes; however, the direction of effect cannot be established in this study. Other research suggests that existing beliefs, attitudes, and behaviors can influence media-related cognitions (Valkenburg and Peter 2013). In the current study, we control for previous substance use behavior and thus reduce the likelihood that the association between media variables and substance use cognitions is simply a function of the children’s behavior. However, differential susceptibility to media messages is an important area for future work, as researchers try to understand the dynamic interplay of determinants of substance use behaviors and cognitions.

Second, this study examines substance use-related cognitions, but does not examine current behavior. These findings on sources of influence may not be generalizable to actual substance use. Furthermore, because substance use behaviors and behavioral intentions are rarely reported by children, it is common practice to collapse measures related to alcohol and tobacco

use into one single construct. However, alcohol and tobacco are two distinct substances with different addictive properties and user profiles, thus the findings for the collapsed outcomes should be interpreted with this in mind. Particularly considering the additional restrictions placed on tobacco advertising (an important direct channel for media messages) as compared with alcohol advertising, it is possible that we would find different patterns of association between the media influence measures and alcohol- or tobacco-specific substance use outcomes. Future studies with larger sample sizes may be able to examine whether the pattern of associations between media-related cognitions and substance use behaviors and intentions varies by substance.

Third, this study relies on children's self-reports of parent usage, peer usage, and media-related variables, and single-reporter data tend to overestimate associations between constructs. However, research on related constructs of children's self-reports of alcohol use behaviors have been found to be reliable and valid (Donovan et al. 2004). Future studies might explore self-report substance use data from parents and peers. Finally, the study uses a convenience sample, and caution should be taken in generalizing the results to the greater population.

Despite these limitations, the present study supports the use of the MIP model for examining how media messages influence alcohol and tobacco use cognitions among children. Previous research has demonstrated that identification with alcohol and tobacco media messages is a proximal antecedent of substance use intentions (Austin et al. 2006; Austin and Johnson 1997a, b). Identification with media messages is believed to be most effectively changed by improving critical thinking skills that target both the logical components (i.e., perceived realism and perceived similarity) and emotional components (i.e., desirability) of the decision-making process (Austin and Johnson 1997a).

Conclusion

This study demonstrates independent associations of parental, peer, and media influence measures with children's preferences, beliefs, and intentions regarding alcohol and tobacco use. It builds on prior research among adolescents, and reinforces the finding that media may play a role in youth substance use initiation. Media influence on adolescent risk behaviors is becoming more widely acknowledged. This is especially true for sexual health outcomes, as adolescents have reported relying on media to access sexual health information more often than doctors and about as often as mothers and teachers (Bleakley et al. 2009). It has been suggested that media function as "sexual super peers" for adolescents that teach them about what is sexually normative (Brown et al. 2005). With respect to substance use outcomes, one can easily see how media may function as a super peer that provides children and adolescents with information about the gratifications of alcohol and tobacco use and very little of the real world consequences that may accompany substance use experimentation.

One promising strategy for youth substance use prevention is media literacy education. Media literacy education (MLE) provides training in the deliberate and thoughtful processing of media messages—that is, in applied critical thinking skills. Let's consider the MIP model in an applied context. Practicing media deconstruction skills involves evaluating a media message based on how realistic the media message seems (i.e., perceived realism) and the extent to which the media message represents the individual's own life experiences (i.e., perceived similarity). If the logical responses to media messages are strengthened by practicing media deconstruction skills, this has the potential to reduce the positive emotional influence (i.e., desirability) of the

message on decision-making regarding risky health behaviors. Adolescents' logical processing of media messages has been found to be an important predictor of current and future substance use behaviors (Scull et al. 2010). Similar findings from the present study with children suggest that early attention to critical thinking about media messages may help to reduce substance use behaviors both in now in childhood and later on in adolescence.

Empirical studies evaluating the effectiveness of MLE programs have provided support for the link between enhancing message processing skills and reducing the likelihood of risk behaviors for both children and adolescents. Results from a randomized controlled trial of an MLE program for elementary school students, Media Detective, provides evidence that children's media-related cognitions (i.e., similarity, realism, and media deconstruction skills) are malleable and relevant to the development of substance use behaviors in late childhood (Kupersmidt et al. 2010). Students participating in the Media Detective program showed increases in media deconstruction skills and reductions in intent to use tobacco products as well as reductions in boys' interest in alcoholbranded merchandise and intent to use alcohol. Likewise, promising outcome results have been reported from a randomized controlled trial of a middle school, substance abuse prevention, MLE program, Media Ready (Kupersmidt et al. 2012). Furthermore, the results from the evaluation of the Media Ready program suggest that not only was the program effective, but also enhancement in logical message processing mediated the effectiveness of this program for reducing interest in future use of alcohol and tobacco products.

MLE, even in small doses, has been shown to be an effective school-based intervention for changing substance abuse outcomes across a range of developmental periods. For example, one-session media literacy programs have been shown to reduce middle school students' identification with images presented in alcohol ads (DeBenedittis et al. 2000) and positively change alcohol expectancies in third grade students in the short and long term (Austin and Johnson 1997a, b). In addition, MLE may have long lasting effects on youth's cognitive processing about media messages. In one follow-up study, students who received MLE programming produced counter-arguments to alcohol advertising months and years after participating in the classes (Slater et al. 1996). Given the role of the media in socializing children's substance use, early and sustained media literacy education is clearly warranted as an integral part of substance abuse prevention efforts in childhood and adolescence.

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Author contributions

TMS conceived of the study, participated in its design and coordination, performed the statistical analyses, and drafted the manuscript. JBK conceived of the study, participated in the design and interpretation of the data, and helped to draft the manuscript. JTE participated in the

interpretation of the data and helped to draft the manuscript. All authors read and approved the final manuscript.

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