Presumed Influence on Peer Norms: How Mass Media Indirectly Affect Adolescent Smoking

Albert C. Gunther, Daniel Bolt, Dina L. G. Borzekowski, Janice L. Liebhart, & James Price Dillard

1 Department of Life Sciences Communication, University of Wisconsin-Madison, Madison, WI 53706
2 Department of Educational Psychology, University of Wisconsin-Madison, Madison, WI 53706
3 Department of Population and Family Health Sciences, Johns Hopkins University, Baltimore, MD 21205
4 Department of Communication Arts and Sciences, Pennsylvania State University, University Park, PA 16802

In the context of adolescent smoking adoption, this study examined the presumed influence hypothesis, a theoretical model suggesting that smoking-related media content may have a significant indirect influence on adolescent smoking via its effect on perceived peer norms. That is, adolescents may assume that smoking-related messages in the mass media will influence the attitudes and behaviors of their peers, and these perceptions in turn can influence adolescents’ own smoking behaviors. Analyzing data from a sample of 818 middle school students, we found that both pro- and antismoking messages indirectly influenced smoking susceptibility through their perceived effect on peers. However, this indirect effect was significantly stronger for prosmoking messages than for antismoking messages, an outcome that most likely increases adolescents’ susceptibility to cigarettes.

doi:10.1111/j.1460-2466.2006.00002.x

People who perceive that mass media can powerfully influence others may, often quite sensibly, react to that perception themselves. These reactions to presumed influence on others fall into two general categories. One category is prevention: Assuming, for example, that sexual content in media will corrupt the morals of others, people may support censorship of such content in an effort to thwart the undesirable outcome. The other reaction is accommodation: Assuming, in this alternative scenario, that advertising is going to influence public opinion about what is fashionable and attractive, people may adopt these new fashions themselves. In both cases, regardless of any actual direct effect, media may be exerting a very real indirect effect on individuals—an indirect effect via presumed influence on others. This general indirect effects model has been called the presumed influence hypothesis (Gunther & Storey, 2003). Prevention reactions have been repeatedly documented over the past 10 years, largely in the context of third-person-effect research (see, e.g., Gunther, 1995;
McLeod, Eveland, & Nathanson, 1997; Rojas, Shah, & Faber, 1996). Attention has only recently turned to accommodation reactions, in which people strive to adapt to perceived changes in others, and these are documented in only a few recent studies (Chia, in press; Gunther & Storey, 2003; Tsfati & Cohen, 2003). Perhaps the most challenging aspect of research on accommodation reactions in the presumed influence model is to identify the mediating variables. That is, what kinds of perceived mass media influence on others might in turn affect these individuals themselves?

One potentially promising answer is influence on peer norms—the frequency with which relevant others enact particular behaviors. Extensive work in social psychology argues that peer norms can exert forceful influences on individuals, especially adolescents, and, at the same time, literature in communication research indicates that perceived peer norms can be powerfully influenced by mass media. Hence, we undertook a test of the presumed influence model by examining the role of perceived peer norms about tobacco use as a mediating variable on the path from smoking-related media content to smoking adoption.

To do so, we tested direct and indirect influences of pro- and antismoking media campaigns on adolescents’ susceptibility to smoking. A general theoretical model, with both direct and indirect paths, is illustrated in Figure 1. As the indirect path in Figure 1 suggests, adolescents may assume that smoking-related content in mass media will influence the attitudes and behaviors of their peers, and these perceptions about peers in turn will influence their own smoking attitudes and behaviors.

Examining the presumed influence model in this context requires review of an extensive literature on tobacco messages in media, normative peer influences, and young peoples’ smoking behaviors.

Although smoking’s damaging health consequences mostly affect people over 30, almost all smokers begin the habit as adolescents. Among many factors potentially influencing young people to smoke, a seemingly likely one is the mass media. Despite

Figure 1 Direct and indirect media effects on adolescent smoking. The indirect path via perceived peer norms illustrates the presumed influence model.
restrictions on mass media advertising for tobacco products, young audiences still encounter substantial content related to smoking across virtually all types of media (Lee, Taylor, & McGetrick, 2004). Ads from major tobacco companies, for example, continue to appear in magazines with large numbers of young readers—magazines like *Rolling Stone, Entertainment Weekly, TV Guide,* and *Sports Illustrated* (Kuczinski, 2001). Content analyses document an increasing rate of tobacco use—now an average of 11 instances per hour—in popular films (Kacirk & Glantz, 2001; Mekemson et al., 2004). Finally, and perhaps inevitably, tobacco marketing has gone online: a recent study identified 88 U.S.-based Internet sites selling cigarettes, some with promotional programs (Ribisl, Kim, & Williams, 2001).

Standard assumptions about direct and powerful media influence, including the influence of mass media messages on smoking, are intuitively reasonable. The cigarette industry, presumably operating under these assumptions, spends heavily on promotion—an estimated $11.2 billion by the five largest cigarette companies in 2001 (United States Federal Trade Commission, 2003). Meanwhile, antismoking message expenditures, although only a fraction of the money spent on prosmoking advertising, are also growing (Pechmann, Dixon, & Layne, 1998).

Some research has established suggestive links between cigarette advertising and smoking adoption (Biener & Siegel, 2000). Other studies report significant associations between self-reported exposure to tobacco advertising and adolescent smoking (Altman, Levine, Coeytaux, Slade, & Jaffe, 1996; Schooler, Feighery, & Flora, 1996). In most cases, these are correlational studies where the direction of causal influence remains a question. However, the aggregate evidence points to a significant influence of prosmoking media content on smoking adoption, if not the processes by which that influence occurs (Biener & Siegel, 2001).

Meanwhile, evidence for the direct influence of antismoking campaigns has been mixed at best. Pechmann (2001) describes “little conclusive evidence of a direct link between advertising-only interventions and reduced adolescent smoking prevalences” (p. 171), although some effect may be inferred from indirect evidence (Pechmann & Ratneshwar, 1994). Some research has reported on antitobacco campaigns that appear effective in preventing or reducing adolescent smoking (Bauman, Laprelle, Brown, Koch, & Padgett, 1991; Farrelly, et al., 2002; Wakefield, Flay, Nichter, & Giovina, 2003). Other studies, however, have found no evidence of such effects (Murray, Prokhorov, & Harty, 1994; Popham et al., 1994). Some antismoking commercials sponsored by tobacco companies have actually produced reverse, or boomerang, effects, apparently increasing adolescent susceptibility to tobacco (Farrelly et al., 2002). A prominent recent research report (Peterson, Kealey, Mann, Marek, & Sarasohn, 2000) concluded that concerted, long-term efforts incorporating mass media campaigns have made no reduction in adolescent smoking adoption rates.

**Influence of perceived peer norms**

Although the role of media may be uncertain, the impact of peer smoking and peer norms is robust and well documented.¹ From the early conformity studies of Asch...
(1952) to more recent research on social influence (Cialdini & Goldstein, 2004), we know that peer groups exert a significant influence on the beliefs, attitudes, and behaviors of their members. Evidence from both cross-sectional and longitudinal research indicates that, among adolescents, peer smoking is strongly related to an individual's smoking behaviors (Aloise-Young, Graham, & Hansen, 1994; Chassin, Presson, Sherman, Montello, & McGrew, 1986). At all grade levels, perceived peer norms show stronger correlations with cigarette use than factors like parental involvement (Olds & Thomas, 2001). One reason social influence is so important in the context of smoking initiation is that adolescents, more than adults or young children, are sensitive to and need to accommodate the conformity pressures stemming from real and perceived social norms (Gibbons, Helweg-Larsen, & Gerrard, 1995).

Many adolescents believe cigarette smoking to be a normative behavior. Young people notoriously overestimate the percentage of their peers who smoke (Gibbons et al., 1995), and interestingly, perceived peer smoking is a stronger predictor of smoking than is actual peer smoking. That is, thinking your friends smoke is more influential than whether or not they really do (Iannotti & Bush, 1992). In addition, research indicates that dominant peer influences come not only from one’s close friends but also from the more general perception of others—others in school or from the larger same-age community (Aloise-Young et al., 1994; Milkie, 1999). Thus, evidence suggests that beliefs about peers’ protobacco attitudes and behaviors, whatever the origin or accuracy of those beliefs, may influence an individual adolescent’s own judgment about smoking.

Given the robust support for peer norms as a proximate cause of adolescents’ decision to smoke, an important question is how teenagers form their impressions of these norms. Direct experience is one obvious basis for impressions. Most adolescents observe the behaviors of close friends and are likely aware of their peers’ attitudes and opinions as well. But experience may not be the only source of information, especially regarding a larger peer group or a group to which one aspires to belong. Thus, important questions remain unanswered: What other factors influence adolescents’ impressions of peer norms about smoking? How are these impressions formed? Do different factors have equal impact on adolescent impressions and are any, or all of them, susceptible to change?

Media influence on perceived peer norms
As noted earlier, mass media messages may have a significant indirect influence on adolescent smoking via their effect on perceived peer norms. To explore this presumed influence model, our study focused in part on how media content may influence adolescents’ impressions of their friends, acquaintances, and others in their social sphere.

The presumed influence model is derived from a vigorous body of research on the third-person effect, a two-stage process that suggests (a) that people systematically perceive greater influence of negative messages on others (potentially overestimating
these effects) than on themselves and (b) that they demonstrate attitudinal or behavioral reactions as a result of such perceptions (Gunther, 1995; Gunther & Ang, 1996; McLeod et al., 1997; Rojas et al., 1996). A critical element in the presumed influence model is the concept of presumed reach. Presumed reach argues that, with greater exposure to media messages, individuals assume these messages reach a wider audience of others, developing a subjective sense that more of their friends, acquaintances, and peers in general are exposed to and influenced by this media content. Thus, perceptions of peer exposure, as suggested in Figure 1, should mediate the relationship between personal exposure to media content and perceived peer norms.

A page from the third-person-effect literature is particularly instructive in the adolescent smoking context. The so-called negative influence corollary (Gunther & Mundy, 1993) proposes that it is primarily messages with negative consequences, that is, messages that would be bad for you, that produce the perception of greater influence on others. This outcome, perhaps rooted in the tendency to believe others are less perceptive and more vulnerable to undesirable outcomes than the self, has been well supported in empirical research (see e.g., Gunther & Thorson, 1992). By the same logic then, messages with positive or desirable outcomes are not seen as nearly so persuasive to others, others who are not as smart or sensible as the self.

This contingency has important implications for tobacco-related media messages. We might expect cigarette advertising, presumably associated with a negative outcome, to be seen as influential on others. Antismoking campaigns, on the other hand, contain beneficial messages and that quality may diminish their perceived impact on others. A study of California primary school students demonstrated precisely this outcome: Students thought that prosmoking ads would have greater influence on other students but said antismoking ads would be more influential on themselves (Henriksen & Flora, 1999).

Perceived impact on others, however, is only the first stage in our model. A critical component of this research is that it goes beyond simple perceived influence and examines the accommodations that result from such perceptions, a process that might be called “the influence of presumed influence.” Two recent health-related studies show support for the influence of presumed influence model—that media content can affect individuals’ attitudes and behaviors via their perceptions of its influence on others. In one, evaluation of a radio campaign to improve maternal health care delivery in Nepal revealed that, although the campaign had no direct effect on general public attitudes toward clinic health workers, there was a significant indirect campaign effect (Gunther & Storey, 2003). People who perceived that the campaign messages influenced clinic health workers also had significantly more favorable attitudes toward health workers themselves and reported improved interactions with health workers during clinic visits. A similar process was suggested in another recent study, this one examining female body image. In interviews, most adolescent girls said they considered mass media images of female body types to be unrealistic. However, most also believed that others, especially boys, are influenced by these images and judge girls by the “media standard” (Milkie, 1999). One might
infer from these observations that media images influence girls’ self-concepts at least in part via the perceived influence of those messages on peers. Both studies provide empirical support for accommodation reactions and for the indirect effect paths in our model. Individuals who perceive media influence on others, accurately or not, may be influenced by that perception to change their own health-related behaviors.

The presumed influence model of indirect media effects does not presuppose that direct effect findings are invalid. Instead it argues that indirect media influences may also play a significant role and thus have important theoretical and practical implications.

Hypotheses and research questions
Building on the theoretical and empirical arguments above, we pose a research question related to direct media effects and then a sequence of presumed influence hypotheses.

**Research Question: Will exposure to prosmoking and antismoking media content be directly related to smoking susceptibility?**

**H1:** Exposure to pro- and antismoking media content will be positively related to perceptions of peer exposure to pro- and antismoking media content, respectively (perceived reach).

**H2a:** Perceived peer exposure to prosmoking media content will be positively related to perceptions of smoking prevalence among peers.

**H2b:** Perceived peer exposure to antismoking media content will be negatively related to perceptions of smoking prevalence among peers.

**H3:** The relationship between perceived peer prosmoking media exposure and perceived smoking prevalence (H2a) will be significantly stronger than the relationship between perceived peer antismoking media exposure and perceived smoking prevalence (H2b) (negative influence corollary).

**H4:** Perceived smoking prevalence will have a direct effect on smoking susceptibility.

**H5:** Perceived smoking prevalence will exert an additional, indirect effect on smoking susceptibility via attitudes toward smoking.

**H6:** Exposure to smoking-related media content will exert a significant indirect effect on smoking attitudes and susceptibility to smoking via perceived smoking prevalence (the influence of presumed influence).

**Method**

**Participants**
Data were collected in spring term, 2003, in a survey of 818 sixth- and seventh-graders in two Wisconsin middle schools. The schools, one in a large metropolitan setting and the other a medium-sized school in a semirural district, represented the two most common types of state middle schools. The proportion of White students (75%) closely matched that of state populations figures. Asian and Black students
were slightly underrepresented, but the two schools provided an oversample of Hispanic and Native American students, the highest at-risk groups.

Procedure
Of 835 students attending school on the two survey administration days, only 17 were denied permission to participate by their parents (via passive consent forms), yielding a 98% response rate. The paper-and-pencil survey was administered by trained teachers during classroom hours. Consent and all other procedures in this study were approved by the University of Wisconsin institutional review board.

Measures
We asked participants about their exposure to antismoking media messages with items like “In the past 30 days, how often have you seen or heard antismoking messages on TV?” followed by a 1–5 response scale ranging from never (none) to all the time (more than once a day). Similar questions were asked for magazines, billboards, radio, and the Internet, using the same response scale. Exposure to prosmoking advertising messages was measured by identical items, but only for magazines, the Internet, and point-of-purchase advertising since tobacco advertising is largely prohibited in other outlets. We also asked how often respondents saw actors smoking on TV and in the movies. These item sets were combined to create two indices, one for antismoking messages and one for pro-tobacco exposure. Because the exposure indices were constructed from indicators related to diverse media channels, we treated them as composite variables (McCallum & Browne, 1993).

To measure participants’ perceptions of their peers’ exposure, we asked “In the past 30 days, how often do you think [other students your age in your school/your close friends] have seen or heard [antismoking messages/ads for cigarettes]?” followed by the same 5-point scales. We also asked how much attention they thought their peers paid to pro- and antismoking messages, followed by a 1–5 scale ranging from no attention to a lot of attention. We combined these items to create composite perceived peer exposure indices.

To operationalize peer norms, we asked participants to estimate smoking prevalence rates among their friends and fellow students. For perceptions of smoking prevalence, we created a number-line labeled from 0% (None) to 100% (All) in 10-percentage point intervals. Students placed an “X” anywhere on the number-line to indicate their estimate of “how many [students your age in your school/of your close friends] smoke cigarettes at least once a week?” A calibrated ruler was used to code this item. These measures allow for a large range of responses that incorporate, but do not require, a complete understanding of percentages. To test reliability of this scale, we used two additional prevalence questions, one asking participants to estimate “how many students out of every 10” smoke and another asking them to simply estimate the percentage of peer smoking using a standard scale of intervals: 0–10%, 11–20%, and so forth. The three prevalence scales demonstrated good reliability (α = .83).
To measure participants’ personal attitudes toward cigarette smoking we asked them to indicate on two 5-point scales (one ranging from *Not at all OK* to *Perfectly fine* and the other from *Completely disapprove* to *Completely approve*) what they think about smoking. These items were highly consistent (α = .98).

To measure smoking susceptibility, we used a scale based on standard smoking behavior or behavioral intention items and derived from the classification scheme originally developed by Pierce and others (Pierce, Choi, Gilpin, Farkas, & Berry, 1998; Unger, Cruz, Schuster, Flora, & Johnson, 2001). We classified participants into four levels: nonsusceptible never-smokers, susceptible never-smokers, experimenters, and established smokers. Longitudinal research indicates this measure of susceptibility is a strong and significant predictor of future tobacco use (Pierce, Choi, & Gilpin, 1996).

Students also answered standard demographic items including age, grade, gender, and ethnicity as well as a series of questions about household smoking.

**Results**

In line with results from previous research on this age group, the majority of our respondents (65%) reported never having tried smoking. Most of those (74% of never-smokers, 48% of the full sample) also expressed a strong resolve not to start smoking, while comparatively fewer said they might experiment (susceptible never-smokers = 17% of the full sample). Nevertheless, 32% reported having already experimented with smoking and an additional 2.5% were classified as established smokers (smoked at least 100 cigarettes). Due to the relatively small number of established smokers (20), the two highest susceptibility categories were collapsed to encompass those individuals who had at least experimented with smoking (35%).

To test the overall theoretical model, we performed a path analysis. Missing observations on some multiitem index variables would have produced a large number of missing cases. (Using pairwise deletion, sample size is conservatively estimated at $n = 487$.) As patterns of missing values were not attributable to any design features, the path analysis was performed using the full-information maximum-likelihood procedure in Mplus 3.0 (Muthén & Muthén, 1998–2004). Although some departures from multivariate normality were present in the data (Mardia’s normalized index = 5.099), they were not in a range considered problematic when applying maximum-likelihood estimation procedures. The standardized skewness (range = −.22 to 1.21) and kurtosis (range = 1.62 to 4.06) measures of individual variables were likewise in the range considered acceptable for maximum-likelihood estimation (West, Finch, & Curran, 1995).

Unstandardized coefficients for individual paths in the hypothesized model, along with standard errors and $z$-statistics, are reported in Table 1 and the path model results, with standardized coefficients, in Figure 2. Table 2 reports the correlation matrix and standard deviations for model variables as well as the proportion of observations that provided information for estimating each variance/covariance value.
We first assessed the overall model with a chi-square goodness-of-fit test. However, because this test is conservative for large sample sizes, various goodness-of-fit indices were also considered, including the root mean square error of approximation (RMSEA) index, the Tucker–Lewis index (TLI), the comparative fit index (CFI), and the standardized root mean square residual (SRMR). Based on the cutoff criteria recommended by Hu and Bentler (1999) the model fit quite well: $\chi^2 = 47.73$, $df = 11$, $p < .001$; RMSEA = .062 (90% confidence interval = .045 to .081); TLI = .94, CFI = .97, SRMR = .042.

Results in Table 1 and Figure 2 indicate that answers to the research question concerning direct effects were mixed. Exposure to prosmoking messages had a significant direct effect on smoking susceptibility. Exposure to antismoking messages exhibited no direct influence.

All other hypothesized paths in the model were statistically significant with effects in the expected direction, suggesting indirect links between exposure to smoking-related media messages and smoking susceptibility. As proposed in H1, the reach hypothesis, higher levels of exposure to pro- and antismoking media messages predicted higher levels of perceived peer exposure to similar content. Perceived peer exposure, in turn, significantly influenced perceived prevalence, supporting the critical presumed influence hypotheses H2a and H2b. In the former case, perceived peer exposure to prosmoking media content was positively associated with perceived smoking prevalence; in the latter, peer exposure to antismoking messages was negatively related—the intended effect of such messages—to perceived prevalence.

We also found support for hypotheses H4 and H5, which predicted significant direct and indirect (through personal attitudes) links between perceived prevalence.
and smoking susceptibility. Higher levels of perceived peer smoking prevalence correlated significantly with more favorable personal attitudes toward smoking which in turn predicted greater susceptibility (standardized indirect effect = .11, z = 6.45, p < .01). In addition to the indirect association between these variables and as predicted by H4, perceived prevalence also significantly predicted smoking susceptibility independent of any changes in personal attitude. The total effect of perceived peer norms on susceptibility via both paths was substantial (standardized β = .50).

Also noteworthy is the fact that respondents dramatically overestimated smoking prevalence. Less than 6% of the sample reported that they smoked at rates equivalent to once a week. The aggregate perception, however, was almost five times higher: adolescents in this study estimated that 28% of their peers smoked weekly.

Most importantly, exposure to pro- and antismoking messages did exert significant (p < .01 in each case) indirect effects on attitudes (standardized indirect effects = .08, −.03, for pro- and antismoking messages, respectively) and susceptibility (.11, −.04, respectively). The overall model accounted for 34% of the variance in smoking susceptibility.

**Figure 2** Path model, with standardized coefficients, of influences of pro- and antismoking media content. Parentheses indicate variance explained.

**p < .01. ***p < .001.**
An important additional question was whether pro- and antismoking messages have substantially different effects. H3, based on the negative influence corollary, proposed that perceived peer exposure to prosmoking messages would exert a significantly stronger influence on perceived smoking prevalence than would perceived peer exposure to antismoking messages. To test this conjecture, we fit a model that restricted these path coefficients to be exact opposites. Because this involves application of a simple linear constraint to the original model, the constrained model is nested in the previous model, and the appropriateness of the constraint can be evaluated using a chi-square difference test. This test produced a $\chi^2 = 29.71$, $df = 1$, $p < .01$, supporting H3 and indicating, as the path coefficients in Figure 2 suggest, that perceived peer exposure to prosmoking messages does have a statistically stronger effect.

Finally, to test for rival, third-variable explanations, we fit an identical model to the same data, now controlling for gender, ethnicity, grade, and household smoking variables. In this analysis, the residuals of the variables, that is, the errors obtained after regressing all seven variables in Figure 2 on the control variables, were analyzed. The model still provided a good fit ($\chi^2 = 42.18$, $df = 11$, $p = .000$; RMSEA = .059, 90% confidence interval = (.041 to .078); TLI = .94, CFI = .97, SRMR = .039), with only minor changes in the path coefficients. Thus, the observed results do not appear to be an artifact of any of these student characteristics.

**Discussion**

These data indicate support for key relationships and theoretical premises in the presumed influence model, even when controlling for other known predictors of smoking. In particular, perception of other students’ exposure to prosmoking content was consistently related to perceptions of smoking prevalence. The more subjects thought other students were exposed to prosmoking content the higher their estimates of peer smoking. In light of the robust connection between perceived peer norms and subject’s own smoking attitudes and behaviors, these results suggest that

---

**Table 2** Standard Deviations, Covariance Coverages* (Along and Above the Diagonal) and Observed Correlations (Shaded Cells Below the Diagonal) for Model Variables

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>SD Prosmoking exposure</td>
<td>5.39</td>
<td>.92</td>
<td>.88</td>
<td>.87</td>
<td>.86</td>
<td>.71</td>
<td>.75</td>
</tr>
<tr>
<td>SD Antismoking exposure</td>
<td>5.0</td>
<td>.58</td>
<td>.95</td>
<td>.87</td>
<td>.90</td>
<td>.72</td>
<td>.74</td>
</tr>
<tr>
<td>SD Perceived peer prosmoking exposure</td>
<td>3.55</td>
<td>.56</td>
<td>.31</td>
<td>.92</td>
<td>.86</td>
<td>.70</td>
<td>.73</td>
</tr>
<tr>
<td>SD Perceived peer antismoking exposure</td>
<td>3.87</td>
<td>.29</td>
<td>.57</td>
<td>.23</td>
<td>.93</td>
<td>.71</td>
<td>.73</td>
</tr>
<tr>
<td>SD Perceived peer norms</td>
<td>8.25</td>
<td>.31</td>
<td>.13</td>
<td>.34</td>
<td>-.07</td>
<td>.74</td>
<td>.63</td>
</tr>
<tr>
<td>SD Personal attitudes</td>
<td>9.27</td>
<td>.16</td>
<td>.06</td>
<td>.21</td>
<td>.02</td>
<td>.38</td>
<td>.77</td>
</tr>
<tr>
<td>SD Smoking susceptibility</td>
<td>.95</td>
<td>.25</td>
<td>.11</td>
<td>.27</td>
<td>-.04</td>
<td>.52</td>
<td>.45</td>
</tr>
</tbody>
</table>

*Covariance coverage represents the proportion of observations that provided information (i.e., nonmissing values) for estimating variance/covariance values.
a substantial part of the influence of prosmoking messages occurs via its presumed influence on peers.

This is a novel theoretical result with potential for important applications. However, findings from the companion analysis of antismoking media content are equally interesting. Young people appear to find antismoking messages persuasive to their peers (although there is no apparent effect on individuals themselves), but they regard such messages as significantly less influential on their peers than prosmoking content.

This asymmetrical result—the fact that adolescents consider prosmoking messages to be substantially more persuasive to their peers than antismoking messages—may seem surprising. It is, however, precisely consistent with the theoretical component of the third-person-effect model known as the negative influence corollary, the tendency to see others as more vulnerable to negative outcomes. Such an explanation seems to apply in this case: The undesirable prosmoking messages were seen as more persuasive to presumably vulnerable others, and antismoking messages, which to most respondents would have a beneficial purpose, were seen as relatively less influential. This scenario may help explain the vexing lack of impact of many major antismoking media campaigns.

Thus, the data indicate solid support for the presumed influence pathways, especially in the case of prosmoking content. However, there is another potential theoretical explanation for the influence of media content on subjective norms, one that might be termed an exemplar effect. That is, media content may give an adolescent audience examples, or representative cues—such as ads showing youthful smokers, or young actors smoking in films—that imply a higher prevalence of peer smoking. This exemplar mechanism does not require any inference about media influence on others, and it would appear in our model in the form of arrows directly from the pro- and antismoking exposure measures to peer prevalence (perceived peer exposure would not play a mediating role). We examined this possibility in a post hoc analysis by fitting the data to a model specifying these two additional paths. The “exemplar” path from antismoking exposure to perceived peer prevalence was small and not significant (standardized β = .06, p = .15) but the corresponding prosmoking path yielded a significant coefficient (standardized β = .20, p < .001).

Adding these two paths reduced the effect of perceived peer exposure to prosmoking content on prevalence, although it was still substantial (standardized β = .27, p < .001), while perceived peer exposure to antismoking content slightly increased (standardized β = −.22, p < .001). Overall model fit (χ² = 22.05, df = 9, p = .009) was significantly improved. This result, although not one we hypothesized, does suggest that there may be more than one route from media content to perceptions of peer norms.

As with any cross-sectional field research, the causal assumptions in this correlational analysis deserve careful thought. One aspect of instrumentation, however, lends a measure of support to the direction of hypothesized paths. The survey measures themselves incorporated a time orientation—exposure items were
retrospective while key susceptibility questions asked about possible future behaviors—that reflects the temporal ordering of effects in the hypothesized model. Of particular concern in this model is a possible projection effect, in which adolescents make inferences about peer norms based on their own attitudes and behaviors. It is plausible, for example, that attitudes about smoking and smoking susceptibility actually drive perceptions of smoking prevalence among peers. However, when we tested this alternative explanation by reversing the causal arrows between those factors, the model produced a slightly less good fit ($\chi^2 = 63.44, df = 9, p < .001$; RMSEA = .084, 90% confidence interval = (.065 to .104); TLI = .89, CFI = .95, SRMR = .043). Indeed a complete reversal of all causal paths resulted in a very poorly fitting model ($\chi^2 = 151.83, df = 11, p < .001$; RMSEA = .122, 90% confidence interval = (.105 to .140); TLI = .80, CFI = .90, SRMR = .101). Thus, the instrumentation and evidence in this study do not support reverse causal paths. However, the direction of effect remains an important question, and longitudinal data or other approaches will be needed to provide a more confident answer.

The results reported here are consistent with new, theory-based conjectures about an indirect media effects model. They also illustrate, through decomposition of effects, how a significant portion of what might appear in a simpler analysis as direct influence is actually attributable to this more subtle path; these data suggested that media content is at least as influential via peer norms as it is via the direct path. In addition, the findings have potential policy consequences. Although tobacco companies continue to insist they market cigarettes only to adults (Ives, 2004), critics are stepping up efforts to contain or reduce prosmoking messages in media, especially messages that may reach youthful audiences. These efforts include more stringent restrictions on tobacco advertising and other promotion as well as public pressure to reduce smoking in popular films (Kacirk & Glantz, 2001). Such movements can draw powerful new arguments from research findings that show a substantial but previously unexplored path by which prosmoking messages may influence adolescent susceptibility.

In addition to policy implications, this alternative theoretical view of media influence may have important applications in campaign designs. It gives us a new way to think about shaping effective antismoking efforts, efforts that might include campaigns aimed at individual’s perceptions of their peers’ tobacco use. Such strategic new interventions might, for example, be aimed at (a) correcting the tendency to overestimate smoking prevalence, (b) countering the misperception that prosmoking media content strongly influences prosmoking attitudes and behaviors of peers and, perhaps most importantly, (c) cultivating or reinforcing the perception that antismoking media messages can actually influence peers’ attitudes and behaviors against smoking. Given the established effect of peer norms on smoking behaviors coupled with adolescents’ tendency—well documented in these data—to overestimate peer prevalence, interventions that capitalize on this new indirect effect model could potentially prevent significant numbers of young people from beginning a tobacco habit.
Perhaps most important, however, are the broader implications of support for an indirect effect model. The findings suggest that perceived peer norms, and the accommodation reactions that such subjective norms can elicit, may be an important factor in the media influence process. In many areas, especially areas important to adolescents—body image, substance use, sexual debut, popular culture, and others—the apparent tide of opinion of friends and other peers appears to be a powerful force. To the extent that mass media content signals which way that tide is flowing, it can exert an indirect but nevertheless significant influence on its audience.

Acknowledgment

Data collection for this study was supported by financial and other assistance from the Robert Wood Johnson Health and Society Scholars Program at the University of Wisconsin-Madison and the University of Wisconsin Comprehensive Cancer Center, a division of the UW Medical School. The authors thank Katie Weber and Kwangjun Heo for data gathering and other assistance.

Notes

1 It is possible to draw a number of potentially useful distinctions that parse the concept of norm more finely (e.g., Lapinski & Rimal, 2005). Our use of the term is intended to reference a descriptive norm, perceptions about what others do, rather than an injunctive norm, perceptions about what others believe one should do.
2 If we include in this calculation all enrolled students, including those absent on the day of data collection, the response rate is 90%.
3 For reasons of parsimony, we combined “close friends” and “other students your age” into a composite measure of peers in this study. However, the social distance corollary in third-person-effect research suggests that perceived influence may be different for proximal and distal peers and we are pursuing that research question in a separate paper.
4 Although mindful of the advantages of latent variables and the ability to account for measurement error in a structural equation modeling analysis, we elected to use path analysis because (a) the media exposure variables function much more effectively as components of composite factors than as reflective indicators of latent factors, (b) the consistent use of “close friend” and “other students your age” indicators for peer exposure and peer norm factors introduced dependencies among indicators across these factors, and (c) there was very high reliability, and thus presumably little error, in the attitude index.
5 Analysis using the full-information maximum-likelihood procedure available in AMOS (Arbuckle & Wothke, 2003) returned essentially identical results.
6 Power estimates for these data are based on the smallest observed size for a given pair of variables (approximately 500). For this sample size, we are able to detect an effect of .10 with power = .72 and an effect of .20 with power > .99 at α = .05 (Cohen, 1988). So in general, we are able to detect small to medium-sized effects with very good power.
7 Although direct effects are not the primary focus of our research agenda, it may be useful to consider the direction of causal influence in these paths. It is possible that
smoking attitudes and behaviors may have influenced participants’ reported exposure to tobacco-related messages in media. Testing a model with these direct paths reversed, so that the causal direction runs from susceptibility to exposure, also produced a good fit ($\chi^2 = 32.57$, $df = 11$, $p < .001$; RMSEA = .048; RMSEA 90%, confidence interval = (.029 to .067); TLI = .97, CFI = .98, SRMR = .027). Thus alternative explanations for the observed, direct path correlations in these cross-sectional data, including also a potential reciprocal relationship, appear possible. More confident interpretations must await more suitable data.

Separate analyses also showed no significant direct influence of exposure to pro- or antismoking messages on attitudes toward smoking.

References


Ribisl, K. M., Kim, A. E., & Williams, R. S. (2001). Web sites selling cigarettes: How many are there in the USA and what are their sales practices? *Tobacco Control, 10*, 352–358.


