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How Peer Proximity Moderates Indirect Media Influence on Adolescent Smoking

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This study examines direct and indirect impacts of antismoking media messages on adolescents' smoking attitudes and intentions to smoke. Elaborating on the influence of presumed influence model, this study incorporates the moderating role of peer proximity (i.e., proximal versus distal peers). Analyzing direct effects in a survey of 1,687 middle school students, we find that antismoking media messages have unexpected effects among both ever-smokers (experimenters and established smokers) and never-smokers. But analysis of indirect paths reveal significant effects in the intended direction. In addition, these effects are moderated by peer proximity. Respondents' perception that proximal peers, but not distal peers, are more influenced by such messages lead to a significant decrease in their favorable thoughts toward smoking and intention to smoke. The data suggest that antismoking messages may only achieve their desired effect via the indirect influence path.

Keywords: *influence of presumed influence; antismoking media campaigns; peer proximity; peer perception*

Although the so-called limited-media-effects paradigm can arguably be classified as an anachronism in contemporary communication research, in one area—public information campaigns—it still has disturbing currency. Evaluations of some multimillion dollar health campaigns have not showed consistently intended impact on attitude and behavior change (Wakefield, Flay, Nichter, & Giovino, 2003; Wakefield et al., 2006; Wartella & Stout, 2002). Especially in this “crowded media world,” where all kinds of health messages and countermessages intermingle, Randolph and Viswanath (2004) urge careful, thorough study of human behavior, including analysis of both direct and indirect media effects.

One important component of human behavior is the fact that people are influenced by what others think and how others behave. This social influence and underlying mechanisms such as conformity are well-documented in the social psychology literature (see Moscovici, 1985, for an overview). Rather than direct observation of and experience with others, individuals often use “available” information to form impressions of other people and then behave on the basis of those subjective social perceptions (Ross & Fletcher, 1985). Such social perceptions may be more or less biased owing to fundamental cognitive errors and to the motivation wherein people want to see themselves in a favorable light relative to others (David, Liu, & Myser, 2004; Paek, Pan, Sun, Abisaid, & Houden, 2005).

Incorporating perceptions about others in the context of media influence, Gunther and Storey (2003) proposed a model termed the *influence of presumed influence* (IPI). The IPI model predicts the indirect influence of media messages on individuals’ attitudes and behaviors via the presumed influence of the given media content on others. Rooted in the third person effect and other perceptual bias concepts in public opinion, the model has been found to be well-suited to health communication contexts such as maternal health care delivery (Gunther & Story, 2003), adolescent smoking (Gunther, Bolt, Borzekowski, Liebhart, & Dillard, 2006), and adolescent sexual initiation (Chia, 2006).

Based on the IPI model, the purpose of this study is to examine the indirect influence of antismoking media messages on adolescent smoking attitudes and behavioral intention via perceived media influence on peers. Gunther and his associates (2006) found that prosmoking and antismoking messages had an indirect impact on adolescents’ smoking attitudes and susceptibility through their perceptions of smoking prevalence among their peers. Expanding on that study, this article explicates a critical distinction: proximal peers, such as close friends, versus distal peers. The moderating role of different layers of peers is drawn from conceptions of “peer proximity” explored by Bearman, Bruckner, Brown, Theobald, and Philliber (1999). Bearman and his associates argue that it is crucial to distinguish proximal from distal peers because the influence mechanism may differ by varying layers of peers.

Further, studies on adolescent substance use suggest that users and nonusers should be treated differently. In the smoking context, susceptible smokers are different from nonsmokers because they have different preexisting beliefs and attitudes (Fishbein, Jamieson, Zimmer, Haeften, & Nabi, 2002) and different levels of response to antismoking messages (Meltzer, 2003; Wolburg, 2004).

Thus, our research questions are threefold: to examine (a) the direct and indirect influences of antismoking messages on adolescents’ smoking attitudes and behavioral intention; (b) the moderating roles of peer proximity—that is, proximal versus distal peers—in the association between antismoking message exposure and adolescents’ responses; and (c) a comparison of the indirect influence model for never-smokers and ever-smokers.

This study incorporates theoretical arguments from media campaigns, peer perceptions, social influences, and tests' resulting hypotheses with survey data collected from midwestern middle school students. We targeted sixth, seventh, and eighth graders, the earliest ages at which some adolescents begin to experiment with tobacco. Scholars have also noted the importance of antismoking prevention programs among younger adolescents because early smoking behavior might be associated with both concurrent and subsequent problem behaviors (Ellickson, Tucker, & Klein, 2001).

We expect our explication of the indirect influence that antismoking messages exert on adolescents' smoking attitudes and intentions to have practical implications for media campaigners regarding the design of more effective campaign messages. These messages may encourage target audiences to conform to their peers' anti-smoking behaviors that are in turn perceived to be influenced by antismoking messages in positive ways.

Antismoking Campaigns and Their Direct Effects

At least 4.5 million U.S. adolescents are estimated to be cigarette smokers and nearly 6,000 children under 18 years of age start smoking every day (American Lung Association, 2003). Because approximately 90% of smokers begin smoking before the age of 21 (American Lung Association, 2003) and because the addictive nature of smoking makes it extremely difficult for once-established smokers to quit smoking, smoking prevention programs often target adolescents. Florida's 1998 "truth" campaign, for example, known as one of the most successful antismoking campaigns, targeted 12- to 17-year-olds (Farrelly, Davis, Haviland, Healton, & Messeri, 2005).

But evidence for the direct influence of antismoking campaigns has been inconclusive (see Wakefield et al., 2003, for an overview). Although the "truth" campaigns have been evaluated as effective in efforts to decrease smoking prevalence (Farrelly et al., 2005) and to develop antismoking attitudes (Randolph & Viswanath, 2004), evaluation studies on 5-year antismoking mass media campaigns in Minnesota reported little impact of such campaigns on smoking-related beliefs (Murray, Prokhorov, & Harty, 1994) or behavior (Murray, Perry, & Griffin, 1992). A major longitudinal study found little association between antismoking media campaigns and adolescent smoking initiation (Peterson, Kealey, Mann, Marek, & Sarason, 2000). Meanwhile, there has been growing concern that antismoking campaigns may have unintended or boomerang effects, in that exposure to such campaigns intensifies initial prosmoking attitudes among young smokers (Meltzer, 2003) or increases adolescents' smoking susceptibility (Farrelly et al., 2002). One 21-year-old male participant in a qualitative examination of 150 college students' responses to antismoking messages said the following: "Those ads just make me want to light up

a cigarette” (Wolburg, 2004). The fact that adolescents are exposed not only to cigarette advertising but also antismoking messages through a diversity of sources and channels makes it difficult to trace the causes of such boomerang effects or the general ineffectiveness of the campaigns.

One explanation for inconsistent findings may be the underexplication of mediating mechanisms through which antismoking campaigns influence people’s smoking behavior. Noting the mixed findings, Wakefield and her colleagues (2003) argued that the intended impact of antismoking advertising might be mediated by a reduction in perceived peer smoking prevalence.

Peer Influence and Influence of Presumed Influence

Adolescents are known to be particularly vulnerable to peer norms and peer influence because they experience rapid psychological and physical development in a short period (Maxwell, 2002). During this process, peers become a primary socializing agent with an enduring effect on an individual’s identity formation and personality development (Harris, 1995).

In literature regarding adolescents’ substance use, peer influence has been well-documented as one of the most important risk factors (e.g., Andrews, Tildesley, Hops, & Li, 2002; Maxwell, 2002). But the literature almost always focuses on the negative—rather than the positive—influence of peers (Bearman, 2002; Maxwell, 2000). Some scholars have argued that peer influence can also work in a positive direction, promoting healthful behavior such as exercise, and actually discouraging negative health behaviors such as smoking (Aloise-Young, Graham, & Hansen, 1994; Weiss, Nesselhof-Kendall, Fleck-Kandath, & Baum, 1990). Indeed, some programs highlight the fact that not using drugs is the norm for their peer group (Hansen & Graham, 1991). These findings may suggest that, as (perceived) peer norms become more consistent with positive behaviors, social influence can be expected to favor them (Aloise-Young et al., 1994).

Further, peer influence often derives not from how peers actually behave but from how adolescents think their peers behave (Iannotti & Bush, 1992; Graham, Marks, & Hansen, 1991). Cognitive developmental theory (CDT; Inhelder & Piaget, 1958) also confirms that the actual environment is not as important as the young adolescent’s perception or understanding of this environment; it is this pattern of understanding itself that is believed to influence the young adolescent’s behaviors—particularly those related to health and substance use (Bush & Iannotti, 1985).

Incorporating perceptions of others in the context of media influence, the IPI model posits the following: “people perceive some influence of a communication on others (presumed influence) and, as a result, change their own attitudes or behaviors (influence of presumed influence)” (Gunther & Storey, 2003, p. 199). The IPI model is well-suited to explicating the mechanisms of antismoking campaign influence via

peer perceptions. There are three reasons for this claim: (a) the model is based on media message effects, and it tests media messages as the origin of peer perceptions; (b) it does not strictly assume that perceptions of peers are biased (unlike contingent theoretical concepts like pluralistic ignorance and false consensus); and (c) it outlines an entire process through which perceptions of peers could mediate the association between media messages and individual's attitude and behavior changes. In their study on the effectiveness of a radio health campaign to improve maternal health care delivery in Nepal, Gunther and Storey (2003) found that the intended effects of the radio drama program were mediated by perceived influence on the target audience and that respondents changed their attitudes or behavior on the basis of their perception of that media influence on others. In an antismoking message context, Gunther and his colleagues (2006) also found that exposure to antismoking messages as well as to prosmoking messages had indirect effects on respondents via their perception of smoking prevalence among their peers.

One thing that the IPI model has not yet explored empirically are the roles played by different layers of peers. Theoretically, the term *peer* signifies a multidimensional concept that includes the following: best friends as the immediate social circle of friends, the peer group with which they interact, and anonymous crowd in their school as the larger social context (Bearman, 2002). It is important to recognize these multiple levels of peers because different kinds of peers play different roles in developing health-related attitudes and behaviors (Bearman, 2002; Clasen & Brown, 1985). Notably, peer influence operates at both proximal (close friends) and distal (leading crowds, peer groups) levels—which Bearman (2002) terms “peer proximity.” Bearman and Bruckner (1999) argue that the influence mechanism is different depending on different layers of peers. For instance, peer pressure may explain the influence of proximal peers such as close friends, whereas the diffusion of a normative climate of values may explain the influence of distal peers (also Brown, 1990).

The idea of peer proximity somewhat overlaps with the concept of social distance in third-person-effect literature. The social distance corollary posits that the self-other perceptual gap of media effects (i.e., third-person perception) increases as the compared “others” become more distant from the respondents themselves. Although the concept was originally defined mainly with respect to geographic distance (Cohen, Mutz, Price, & Gunther, 1988), a body of research has tested it with different operationalizations, such as “close” (friends and acquaintances) versus “remote” (people in general) groups, “vague” versus “specific,” and “close friends” versus “distant” others (see Paek et al., 2005, for more details).²

Thus, we adopted the IPI model as a theoretical framework that incorporates antismoking media messages, perceived influence of media messages on peers, and respondents' reactions. In addition, we incorporated the concept of peer proximity into the model and hypotheses to test their potential as moderating variables.

Overall, the IPI model comprises three parts. First, perceived exposure (or perceived reach) is a necessary condition for inferences about the effects of media messages on

others. Perceived exposure proposes that individuals infer others' exposure to these messages based on their own exposure (Gunther, 1998; Gunther & Christen, 1999; Gunther, Christen, Liebhart, & Chia, 2001). This is because people are willing to make strong inferences based on small amounts of data (Nisbett & Ross, 1980), and, due to the law of small numbers bias (Tversky & Kahneman, 1971), because they tend to think that their own pattern of media use is similar to the patterns of others. In addition, people take it for granted that media, especially media they encounter themselves, have a characteristically broad reach (Gunther, 1998). Hence, the degree to which adolescents are exposed to antismoking campaigns will determine the degree to which they think their peers, both proximal and distal peers, are exposed to the same kind of campaign messages.

Hypothesis 1a: Exposure to antismoking messages will be positively related to perceptions of distal peers' exposure to antismoking messages.

Hypothesis 1b: Exposure to antismoking messages will be positively related to perceptions of proximal peers' exposure to antismoking messages.

The next stage in the IPI model suggests that people think that others' exposure to media messages will influence others' attitudes and behaviors (Gunther & Storey, 2003). In the third-person-effect literature, McLeod, Eveland, and Nathanson (1997) also found that people perceive greater effects of media messages on others when they think others are more exposed to such messages. Although Gunther and his colleagues (2006) tested the IPI model using perceived smoking prevalence among peers as the key mediating factor, in this analysis we chose to focus on perceived message influence on peers, a traditional concept in third-person-effect studies.

Hypothesis 2a: Perceived distal peer exposure to antismoking messages will be positively related to the perceived influence of the message.

Hypothesis 2b: Perceived proximal peer exposure to antismoking messages will be positively related to the perceived influence of the message.

Finally, the IPI hypothesis predicts that people's perception that others are influenced by messages in turn influences their own attitudes and behaviors. Proposing the IPI model, Gunther and Storey (2003) supported their hypothesis in an evaluation study on a radio campaign intended to improve maternal health care delivery in Nepal. People who believed that the campaign influenced clinic health workers also had more favorable attitudes toward health workers and reported improved interactions when visiting a clinic. A similar process was suggested in a study of female body image (Milkie, 1999). Adolescent girls said they considered female images in mass media to be unrealistic. But most also believed that others, especially boys, are influenced by these images and judge girls by the "media standard" (Milkie, 1999). These results suggest that the perceived influence of media content on peers is influencing girls'

own self-concept. Both studies provide empirical supports for the idea that individuals who perceive media influence on others, accurately or not, may be influenced by that perception to change their own health-related behaviors. It also supports the idea that in many settings, people may be more readily influenced by what they think their peers think, or do, than they are directly by media.

In this model there are two parallel paths corresponding to the two levels of peers and we expected significant effects for both.

Hypothesis 3a: The perceived effects of antismoking messages on distal peers will be negatively related to attitudes toward smoking and behavioral intention.

Hypothesis 3b: The perceived effects of antismoking messages on proximal peers will be negatively related to attitudes toward smoking and behavioral intention.

Theoretically, as Bearman and Bruckner (1999) argue, conformity, the primary mechanism of proximal peer influence among adolescents, is likely to be stronger and more immediate than the diffusion mechanism by which distal peer influence occurs. In cognitive development and identity formation for younger adolescents, references to intimacy as a basis of friendship increases and thus proximal peers or cliques become more relevant (Buhrmester & Furman, 1987; Crockett, Losoff, & Petersen, 1984).

Other social psychology literature also proposes that close peer perceptions have a stronger role in predicting one's own behavior than distant peer perceptions in one way or the other. According to reference group theory (Hyman & Singer, 1968; Sherif & Sherif, 1964), for example, adolescents' proximal peers are more likely to be their significant reference groups and thus more prone to influence their attitudes and behaviors. When they compare themselves to other students or peers to ensure that their own attitudes or behaviors are appropriate (Festinger, 1954), they tend to follow reference group or in-group norms rather than nonreference or out-group norms (Turner, 1991; Yanovitzky et al., 2006). Last, the Theory of Reasoned Action (TRA) and the Theory of Planned Behavior (TPB) also incorporate the role of normative influence in predicting individuals' own behavioral intention (Ajzen, 1991; Ajzen & Fishbein, 1980). The normative influence, represented by subjective norms, operates as a joint function of normative beliefs about the social expectations of significant others (most directly related to oneself) and one's motivation to comply with those significant others (Ajzen, 1991; Ajzen & Fishbein, 1980). All of these theoretical arguments echo the argument by Bearman and Bruckner (1999) about differential mechanism across layers of peers.

Empirical studies have also supported this theoretical argument in that, compared to friends in general, best friends are found to be more influential with regard to a variety of substance uses such as drinking (Yanovitzky et al., 2006) and smoking (Urberg, 1992). For example, Yanovitzky and his colleagues (2006) found that perceived alcohol use by close peers was a stronger predictor of respondents' own alcohol use than perceived alcohol use by more distant peers (e.g., students in general), even

after controlling for other significant predictors of alcohol use (e.g., sensation-seeking tendencies and major demographic variables).

Therefore, we expected the influence of presumed influence to be stronger for proximal than for distal peers.

Hypothesis 3c: The perceived effects of antismoking messages on proximal peers will be more strongly related to both attitude toward smoking and intention to smoke than will be perceived effects on distal peers.

Studies on adolescent substance use suggest that users and nonusers should be treated differently (Fishbein et al., 2002). In smoking contexts, smokers are different from nonsmokers because they have different preexisting beliefs and attitudes (Sussman et al., 1988) and different levels of response to antismoking messages (Meltzer, 2003; Wolburg, 2004). Smokers and nonsmokers are also likely to have different peer networks (Kirke, 2004). Because beliefs, response processes, and peer networks may all be different for the two groups, and because individuals' level of smoking are found to be significantly related to their perception about others' smoking (Prentice & Miller, 1993), combining smokers and nonsmokers may confuse interpretations of the findings on peer perceptions.

Given the fairly compelling rationale that smokers and potential smokers differ from nonsmokers in their varying degrees of estimation of smoking prevalence and of preexisting smoking attitudes, we examined the two groups separately.

Research Question 1: Are the direct and indirect relationships observed earlier different between ever-smokers and never-smokers?

Method

Participants

Data were collected in fall 2003 in a survey of 1,687 sixth through eighth graders in four Wisconsin middle schools: Tomah = 34.2%, ($n = 577$); Beloit = 44.4 %, ($n = 749$); Mishicot = 7.9 %, ($n = 133$); and Salem = 13.5%, ($n = 228$).

The proportion of White students (75.2 %) closely matched that of state population figures, whereas Black (9.7%), Hispanic (6.8%), and Asian (.6%) students were slightly underrepresented. Approximately half of the respondents were girls (49.6%) with most students (90%) between ages 11 and 13.

Procedures

Ten days preceding administration of the survey, teachers asked students to deliver parental consent forms to their parents or guardians. Teachers gave a

reminder 2 days before survey administration. Parents were instructed to read and sign the consent form but to return it only if they refused permission for their child to participate. The response rate was 89% when accounting for absentees on the days of survey and those who did not receive parental consent.

The paper-and-pencil survey was administered by teachers, who had received a training module on the survey, during classroom hours. Teachers informed students that their answers would be completely confidential and that they could decline to answer any questions. Students were offered an alternative activity either at their desks or in the school library if they lacked parental consent or declined to participate themselves. Most participants answered the 72 items in approximately 25 minutes.

Measures

For exposure to antismoking messages we asked participants the following: In the past 30 days, how often have you seen [or heard] antismoking messages (1) on TV, (2) on the radio, (3) on the Internet, (4) in magazines, and (5) on billboards or outdoor signs? Each item was followed by a 5-point scale (1 = *never*, 2 = *hardly ever*, 3 = *sometimes*, 4 = *often*, 5 = *all the time*). Exploratory Factor Analysis (EFA) with Principal Component Analysis (PCA) extraction method shows clearly one factor with 59% of variance explained. Cronbach's alpha reliability also indicates strong internal consistency ($\alpha = .82$).

To measure participants' perceptions of their proximal peers' and distal peers' exposure, we asked the following: 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? This was followed by the same 5-point scale.

For perceived influence of antismoking messages on the two target peer groups, we asked participants the following: How much do antismoking messages make [other students your age in your school/your close friends] want to avoid smoking? This was followed by a 5-point scale ranging from *not at all* (1) to *a lot* (5).

Respondents' attitudes toward cigarette smoking and behavioral intention to smoke served as outcome variables. For personal attitudes toward cigarette smoking, five affect-oriented bipolar attitude items were asked using a 5-point scale: What do you feel about people who smoke cigarettes? (*immature to grown-up*, *not good-looking to good-looking*, *boring to exciting*, *not cool to cool*, and *not popular to popular*). EFA (with eigenvalue criteria of 1) indicated a one-factor solution with 81% of variance explained ($\alpha = .95$). Higher values indicated more favorable attitudes toward smoking.

For the behavioral intention measure, respondents were asked the following four questions with a 4-point scale (1 = *definitely yes* to 4 = *definitely not*):

1. Do you think that in the future you might experiment with cigarettes?
2. Do you think you will smoke a cigarette at any time during the next year?

3. Do you think you will be smoking cigarettes five years from now?
4. If one of your best friends offered you a cigarette, would you smoke it?

Then, the four items were reversed and averaged to create an index of behavioral intention. EFA result shows that the four items clearly constitute one factor with 78% of total variance explained (Cronbach's $\alpha = .90$).

Besides the variables shown earlier, three demographic items served as exogenous variables for the purpose of control: gender (male as a reference), grade, and race. Race variables were recoded as binary with 0 being "White" (71%) and 1 being "minority" (29%). In terms of grade, 37.5% of the respondents were sixth graders, 34.2% were seventh graders, and 27.9% were eighth graders.

Finally, to compare the two groups (i.e., never-smoker and ever-smoker), binary scale of smoking status was created. Only those who answered consistently "never smoked in their entire life" across multiple smoking-related questions (e.g., trial smoking, lifetime smoking, amount of smoking in the previous 30 days, last time smoking) were categorized as the never-smoker group (69%); those who had ever smoked—even if a few puffs—were categorized as the ever-smoker group (31%). Descriptive characteristics of the variables among pooled sample and the two separate groups (never-smokers and ever-smokers) are reported in Table 1.

Model Specification

Before fitting the structural equation model to examine direct and indirect causal relationships, we performed multigroup confirmatory factor analysis to (a) verify the factor structure and (b) guarantee cross-validity for the never-smoker versus the ever-smoker group comparison. The three latent factor structure with 14 variables (five items for antismoking exposure, five items for attitudes toward smoking, four items for behavioral intention) showed a reasonably good fit, $\chi^2(148) = 423.72$, RMSEA = .05, NNFI = .98, SRMR = .03, CFI = .98, across the two groups, meaning that the two groups both fit very well with our model and can be statistically compared (see Figures 1 and 2 for factor loadings).³

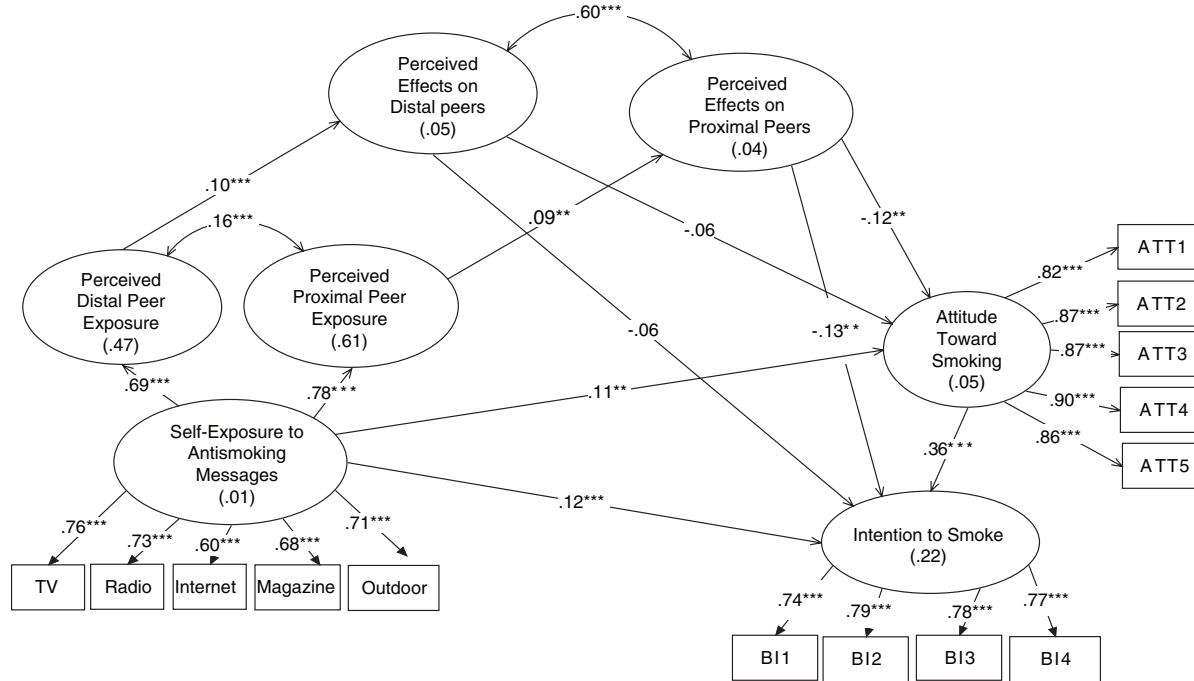
After fitting the measurement model, we performed multigroup structural equation modeling with the covariance matrix to test the hypothesized model (see Appendixes A and B for the correlation matrix for each group). The LISREL 8.30 program was employed with maximum-likelihood estimates (Jöreskog & Sörbom, 1996). The model is tested statistically for consistency with the data. Provided the model produces a reasonably good fit, individual path coefficients can be tested for significance and compared to evaluate the relative influence of predictor variables.

The three demographic variables—gender, grade, and race—serve as exogenous variables that link all the paths to the variables. To simplify presentation, these exogenous variables, along with correlations of their error terms and measurement errors of all the variables, were not shown in our model.⁴

Table 1
Descriptive Characteristics

Variable Items	Pooled Sample (<i>N</i> = 1,687)		Never-Smokers (<i>n</i> = 1,157)		Ever-Smokers (<i>n</i> = 530)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Self-exposure to antismoking messages						
On TV	3.24	1.27	3.14	1.29	3.45	1.22
On the radio	2.52	1.25	2.40	1.22	2.78	1.27
On the Internet	2.02	1.20	1.94	1.17	2.22	1.25
In magazines	2.62	1.28	2.51	1.26	2.84	1.31
On billboards/outdoor signs	2.74	1.28	2.66	1.22	2.93	1.22
Perceived peer exposure to antismoking messages						
Other students your age in your school	3.26	1.18	3.17	1.56	3.45	1.20
Your close friends	3.06	1.14	3.01	1.13	3.17	1.15
Perceived message influence on peers						
Other students your age in your school	3.28	1.26	3.37	1.26	3.09	1.25
Your close friends	3.79	1.45	4.00	1.37	3.32	1.50
Attitudes toward smokers						
Grown-up	1.74	1.09	1.50	.93	2.26	1.22
Good-looking	1.84	1.12	1.61	.98	2.34	1.23
Exciting	1.85	1.16	1.60	1.00	2.39	1.28
Cool	1.80	1.16	1.52	.96	2.40	1.32
Popular	1.93	1.23	1.64	1.07	2.55	1.33
Intention to smoke						
Do you think that in the future you might experiment with cigarettes?	1.72	.86	1.48	.70	2.25	.97
Do you think you will smoke a cigarette at any time during the next year?	1.48	.82	1.20	.48	2.13	1.03
Do you think you will be smoking cigarettes 5 years from now?	1.55	.75	1.34	.56	2.02	.88
If one of your best friends offered you a cigarette, would you smoke it?	1.46	.78	1.20	.46	2.05	.99

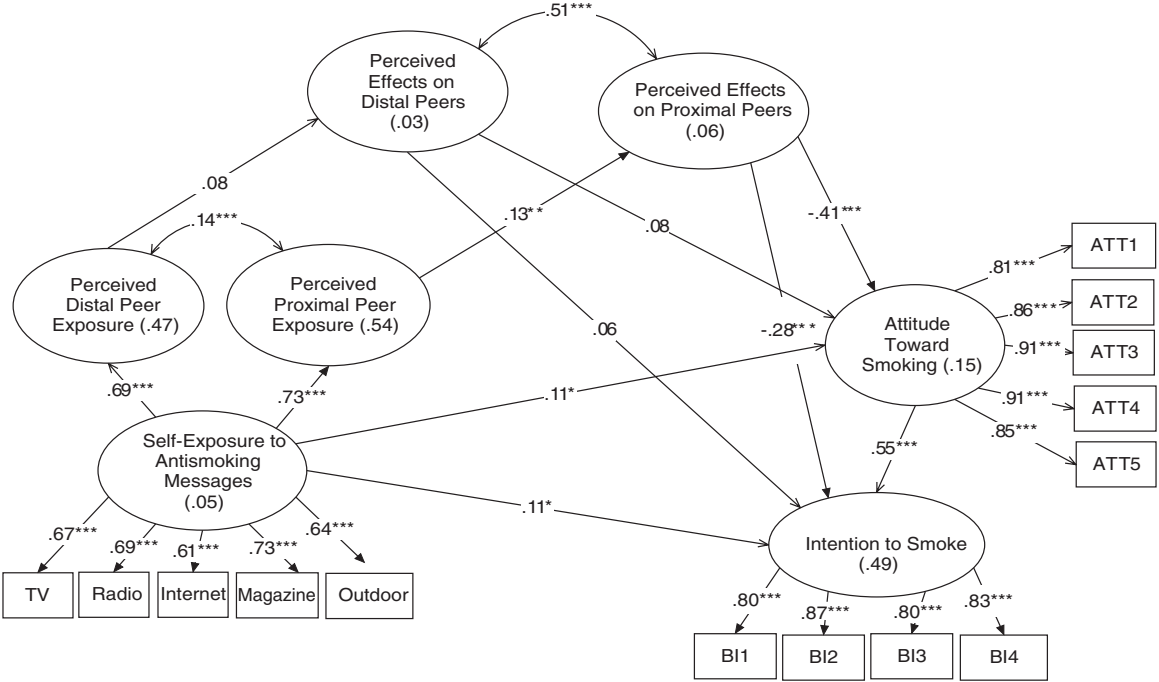
Figure 1
Direct and Indirect Influence of Anti-Smoking Messages on Adolescents' Attitudes
and Behavioral Intention (Never-Smoker = 902)



Note: All the coefficients are completely standardized. Demographic variables (gender, race, grade) are included as exogenous variables, but not shown here. The four items, perceived exposure of proximal peers and of distal peers, perceived effects of antismoking messages on distal peers and on proximal peers, are latent constructs with a single item.

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

Figure 2
Direct and Indirect Influence of Anti-Smoking Messages on Adolescents' Attitudes
and Behavioral Intention (Ever-Smoker = 391)



Note: All the coefficients are completely standardized. Demographic variables (gender, race, grade) are included as exogenous variables, but not shown here. The four items, perceived exposure of proximal peers and of distal peers, perceived effects of antismoking messages on distal peers and on proximal peers, are latent constructs with a single item.

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

Guided by the IPI hypothesis (Gunther et al., 2006; Gunther & Storey, 2003), we modeled intention to smoke as the outcome variable that is influenced by exposure of self to antismoking messages, perceived influence of antismoking messages on proximal peers and on distal peers, and attitude toward smoking. We also expected that attitude toward smoking, an intervening dependent variable on the path to behaviors, would also be influenced by exposure to antismoking messages and perceived influence of antismoking messages on proximal and distal peers.

To support our rationale to examine the two target peers (proximal peers and distal peers) separately, we performed mean difference tests between the two peer groups in terms of perceived effects of antismoking messages. The paired *t* tests indicate that adolescents perceived greater effects of antismoking messages on their proximal peers than general others [$\Delta = .63$, $t(1609) = 19.75$, $p < .001$, for never-smokers; $\Delta = .22$, $t(1609) = 3.92$, $p < .001$, for ever-smokers]. The difference in perceived influence between proximal and distal peers provides a rationale for us to examine different roles of the two target peers in our IPI model.

As shown in Figures 1 and 2, the perceived-exposure hypothesis guides us to draw causal paths from exposure of self to antismoking messages to perceived exposure of proximal and distal peers separately, and the IPI hypothesis led us to expect exposure to antismoking messages of proximal and distal peers to influence perceived effects of such messages (i.e., the perception that others want to avoid smoking) on the two target peer groups, respectively. The error terms between perceived exposure of proximal and distal peers, and between perceived effects on proximal and distal peers, were allowed to be correlated because the measures come from respondents' perception about others rather than the two different others' actual behaviors. Finally, missing values were treated with listwise deletion.

Results

Our analysis indicates that the model fits very well across the two groups based on several goodness-of-fit statistics [$\chi^2(318) = 766.35$, RMSEA = .05, NNFI = .97, SRMR = .03, CFI = .98]. Figures 1 and 2 show standardized coefficients and statistical significance for never-smoker and ever-smoker groups.

First, our model shows the direct influence of antismoking messages on attitude toward smoking and intentions to smoke appears unintended. The more the respondents were exposed to antismoking messages, the more likely they would have favorable attitudes toward smoking and intention to smoke. But, through the mediating mechanism of presumed influence of antismoking messages on proximal peers, such message exposure had significantly negative (thus, intended) effects on attitude toward smoking ($\beta = -.01$, $p < .01$, for never-smokers; $\beta = -.04$, $p < .001$ for ever-smokers), but not on intention to smoke in both groups (see Tables 2 and 3). The hypothesis tests examine the components of this significant indirect influence step by step.

Table 2
Total and Indirect Effects on Behavioral Intention to
Smoke Among Never-Smokers (*n* = 902)

	1	2	3	4	5	6	7
1 Total	—	—	—	—	—	—	—
Indirect	—	—	—	—	—	—	—
2 Total	.69***	—	—	—	—	—	—
Indirect	—	—	—	—	—	—	—
3 Total	.78***	—	—	—	—	—	—
Indirect	—	—	—	—	—	—	—
4 Total	.07***	.10***	—	—	—	—	—
Indirect	.07***	—	—	—	—	—	—
5 Total	.07**	—	.09**	—	—	—	—
Indirect	.07**	—	—	—	—	—	—
6 Total	.10**	-.01	-.01*	-.06	-.12**	—	—
Indirect	-.01**	-.01	-.01*	—	—	—	—
7 Total	.15***	-.01	-.02*	-.08	-.17***	.36***	—
Indirect	.02	-.01	-.02*	-.02	-.04**	—	—

Note: 1. Exposure to antismoking message; 2. Perceived exposure of other peers to antismoking message; 3. Perceived exposure of close friends to antismoking message; 4. Perceived effects of antismoking messages on other peers; 5. Perceived effects of antismoking messages on close friends; 6. Attitude toward smoking; 7. Behavioral intention to smoke. All the coefficients are standardized.

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

Table 3
Total and Indirect Effects on Behavioral Intention to
Smoke Among Ever-Smokers (*n* = 391)

	1	2	3	4	5	6	7
1 Total	—	—	—	—	—	—	—
Indirect	—	—	—	—	—	—	—
2 Total	.69***	—	—	—	—	—	—
Indirect	—	—	—	—	—	—	—
3 Total	.73***	—	—	—	—	—	—
Indirect	—	—	—	—	—	—	—
4 Total	.05***	.08**	—	—	—	—	—
Indirect	.05***	—	—	—	—	—	—
5 Total	.10**	—	.13***	—	—	—	—
Indirect	.19**	—	—	—	—	—	—
6 Total	.07**	.01*	-.05***	-.08*	-.41***	—	—
Indirect	-.04**	.01*	-.05***	—	—	—	—
7 Total	.13***	.01*	-.07***	-.11**	-.51***	.55***	—
Indirect	.02	.01*	-.07***	-.04*	-.23***	—	—

Note: 1. Exposure to antismoking message; 2. Perceived exposure of other peers to antismoking message; 3. Perceived exposure of close friends to antismoking message; 4. Perceived effects of antismoking messages on other peers; 5. Perceived effects of antismoking messages on close friends; 6. Attitude toward smoking; 7. Behavioral intention to smoke. All the coefficients are completely standardized.

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

Hypotheses 1a and 1b, guided by the notion of perceived exposure, were supported. Irrespective of their experience of smoking, those who were more exposed to antismoking messages were more likely to believe that their proximal peers and distal peers were also more exposed to such messages.

Hypotheses 2a and 2b, based on the IPI model, concern significant associations between perceived exposure of others and perceived influence on others. These hypotheses were partially supported. Both proximal peers' and distal peers' exposure to antismoking message were significantly related to perceived influence of such messages on proximal peers and on distal peers, respectively, among never-smoker group, whereas, among ever-smoker groups, only the association between perceived exposure of proximal peers and perceived influence of the messages on proximal peers was significant.

Hypotheses 3a and 3b, addressing the IPI hypothesis, were supported, but only in the case of proximal peers. For both never-smoker and ever-smoker groups, perceived effects of antismoking messages on proximal peers were significantly negatively related to attitudes toward smoking and intention to smoke.

Hypothesis 3c predicted that the association between perceived effects on proximal peers and attitude toward smoking and behavioral intention would be stronger than that between perceived effects on distal peers and the two outcome variables. To test the hypothesis, we fit a model that restricted the two path coefficients to be equally constrained for each of the paths between perceived effects and attitudes toward smoking and behavioral intention. The two constrained models are nested in the previous model, and thus, can be compared statistically using a chi-square difference test. Our model testing results indicated that the effect of perceived influence on proximal peers on attitude toward smoking and on behavioral intention is significantly stronger than for perceived influence on distal peers, but only for the ever-smoker group [$\chi^2 D(1) = 19.97, p < .001$, for attitude toward smoking; $\chi^2 D(1) = 12.86, p < .001$, for behavioral intention].

As addressed in our Research Question 1, we also compared the two models (never-smoker group and ever-smoker group), in terms of statistical difference of impact that perceived influence on proximal peers has on attitude toward smoking and behavioral intention. In a similar way to testing moderating effects of peer proximity, we constrained the path coefficients of the two models to be equal. Results indicated that the path coefficients from both perceived effects on proximal peers to attitude toward smoking and to behavioral intention were significantly larger in the ever-smoker group model than in never-smoker group [$\chi^2 D(1) = 17.74, p < .001$, for attitude toward smoking; $\chi^2 D(1) = 8.63, p < .001$, for behavioral intention]. In other words, the association between perceived effects on proximal peers and respondents' own attitudes toward smoking and intention to smoke is much stronger among ever-smokers than never-smokers.

There were significant associations between attitude toward smoking and intention to smoke in both never-smoker ($\beta = .36, p < .001$) and ever-smoker groups ($\beta = .55$,

$p < .001$); however, the association was significantly stronger in the ever-smoker group than in the never-smoker group [$\chi^2 D(1) = 17.70, p < .001$]. Although unverifiable statistically, fit for the ever-smoker group model appears better in terms of multiple goodness-of-fit indexes, and explained more variance in our two outcome measures ($R^2 = .15$ for attitude toward smoking and $.49$ for behavioral intention in ever-smoker group; $R^2 = .05$ for attitude toward smoking and $.22$ for behavioral intention in never-smoker group).

Discussion

Built on the IPI model, this study examines how antismoking media messages directly and indirectly influence adolescents' smoking attitudes and behavioral intention. The model provides researchers with a useful mediating mechanism to understand how antismoking messages influence adolescents' attitudes and behaviors.

The data suggest, rather dramatically, that antismoking messages produced effects opposite to those intended—actually increasing participants' prosmoking attitudes and intentions to smoke. Although startling and potentially worrisome, these results are not inconsistent with existing literature on the effects of antismoking campaigns that report very mixed results (e.g., Wakefield et al., 2003). Previous studies on unexpected or boomerang effects have mostly applied to smokers who might have had preexisting inclinations toward smoking, and thus, would be more likely to resist antitobacco persuasion (e.g., Wolburg, 2004; see also Fishbein et al., 2002, for boomerang effects in antidrug campaign contexts). In addition, such resistance is highly likely among adolescents because they are known for rebelliousness against adult authority and because smoking is a symbol for that rebelliousness. It is well-documented that adolescents with risk-taking, rebellious, and sensation-seeking tendencies are more likely to use substances (e.g., Henry, Slater, & Oetting, 2005; Stephenson & Palmgreen, 2001).

Past studies have also demonstrated that antismoking messages, which younger children responded to quite favorably, may be derogated by adolescents because they do not like restrictions on their freedom of choice (Grandpre, Alvaro, Burgoon, Miller, & Hall, 2003). Accordingly, messages that overtly argue against smoking may trigger the rebellious impulse to do the opposite.

In fact, some have argued that the tobacco industry has used the rebellious mind-set of adolescents to promote smoking (see Cialdini, 1993, for illustration). Antismoking messages sponsored by tobacco companies such as Phillip Morris's "Think. Don't Smoke" campaigns were also found to have an unintended effect in ways that enhance prosmoking attitudes and smoking initiation (Farely et al., 2002). Thus, the unintended direct-effect finding in this study is consistent with some previous research and raises the question of whether this unexpected impact is the result of message features or adolescent characteristics, or both. These are very intriguing empirical questions for future research.

A second explanation might be that a flood of various types of smoking-related media messages may overwhelm youth for whom the salience of smoking may simply be raised by both kinds of campaigns. In support of that possibility, Gunther et al. (2006) found that adolescents who are more exposed to antismoking messages also reported more frequent exposure to prosmoking messages (see also Paek, 2006, and Paek & Gunther, 2006, for the same findings). Given that antismoking media campaigns led by nonprofit organizations and by tobacco companies are both prevalent,⁵ it may be hard for audiences to distinguish the intentions of such messages. In a similar vein, some scholars argue that the nationwide tobacco control efforts have failed to develop consistent and compelling antismoking messages (Menashe & Siegel, 1998). The fact that not all antismoking campaigns have uniformly intended impact on adolescent smoking (e.g., Farrelly et al., 2002; Wakefield et al., 2006) may also support this speculation.

Similarly, as noted by Hyman and Sheatsley (1947) many decades ago, another explanation may include people's selective interpretation after exposure. Although they are exposed to antismoking messages, adolescents may remember only smoking-related images and words, which increase their curiosity about smoking. Especially in early adolescence when young people are still in the process of cognitive development, the perception and interpretation of a given message might not be the same as it is for adults. Thus, Millstein (1993) warns researchers, "the assumption seems to be that the message we intend to convey is in fact the message that they [adolescents] receive. Not only is this likely to be erroneous, it also may be dangerous" (p. 105). The selective perception and interpretation processes for a specific target audience should be more closely examined in future studies.

In contrast to the direct, prosmoking effects of antismoking messages on adolescents' attitudes and behavior, these data reveal an indirect path via perceived influence on peers that appears to accomplish the intended effect. These results imply that campaign planners may fail at the standard, direct effect they presumably aim for, but succeed via an indirect path that is most likely unanticipated. But intentions aside, the "successful" indirect path—reducing or reversing unexpected effects—significantly counteracts the failure of the direct effects model.

In addition, by measuring and examining proximal and distal peers separately, this study allows for a more nuanced analysis of the indirect-effect process. The data show that never-smokers perceive that both their proximal peers and other students their age are influenced by antismoking messages in the intended direction, whereas only perceived influence on proximal peers is significantly related to smoking attitudes and intentions. For ever-smokers (including experimenters and established smokers), only the influence path to proximal peers is significant, and proximal peers, in turn, have a strong influence on attitudes and intention to smoke. This finding is a bit at odds with the majority of third-person effect analyses, showing more perceived influence on distal than on proximal others. But it is not theoretically inconsistent because a subset of this work, sometimes called first-person effect,

shows that for positive or beneficial messages, perceived influence can be greater for the self and presumably others who are socially proximal to the self (Duck, Terry, & Hogg, 1995; Gunther & Mundy, 1993; Gunther & Thorson, 1992; Henriksen & Flora, 1999; Neuwirth, Frederick, & Mayo, 2002). Antismoking messages will likely be perceived by most of our respondents as beneficial rather than harmful, and beneficial messages represent the special case where relatively less influence is perceived for distal others (see Paek et al., 2005).⁶

Overall, these data suggest that perceived influence on distal peers matters little to adolescents' smoking. This finding makes sense because, as discussed earlier, it is likely to be proximal peers and one's significant others who have the strongest influence on self, especially in the early stage of adolescence (Buhrmester & Furman, 1987; Crockett et al., 1984). But we should note that different levels of peers may be very influential in different social situations, and we may yet find distal peers to be quite important in some pivotal decision-making circumstances.

As with any cross-sectional field research, some attention is due to the causal direction of the direct and indirect relationships in this structural equation model. In this model, particular concerns surface between antismoking message exposure and attitudes. Although specific question wording in the exposure measures (i.e., in the previous 30 days, how frequently do you watch . . .?) enables us to assume the exposure as antecedent, one rival hypothesis centers on the causal influence of preexisting attitudes on adolescents' self-reported exposure to antismoking messages. We tested this possibility in a post hoc analysis by fitting the model that reverses the causal path between exposure to antismoking messages and smoking attitudes. The model produced a fit as good as the one in our original model but the path (attitudes \rightarrow exposure) coefficients were slightly weaker ($\beta = .11, p < .01$, for never-smokers; $\beta = .08, p = ns$ for ever-smokers). Although this path, as well as other reverse paths, cannot be entirely ruled out, the data present no evidence in its favor. Panel data should clarify this causal direction more clearly in future studies.

Another concern is the general measure of self-reported exposure to antismoking messages in the instrument. These are fairly standard exposure measures in tobacco research, but uncertainty remains about the exact nature of the relevant media content (see Slater, 2004, for review of different types of exposure measure). Although recognition and recall measures may work better in researchers' examination of a specific media campaign's effectiveness, our goal was to assess adolescents' general opinion of, and reaction to, antismoking messages. This global assessment may be more realistic given the quantity of smoking-related messages available to audiences in such a cluttered media world (Randolph & Viswanath, 2004).

Finally, to test the validity of findings in a study with self-reported questionnaires that involve potential social desirability biases, we conducted a post hoc analysis controlling for respondents' confidence in the confidentiality of their answers (question wording: Are you confident that no one will know what answers you gave to this survey?) and the honesty of responses (i.e., Did you feel able to give completely honest

answers to these questions?). Even after this additional, stringent control, the patterns of model fit and the path coefficients remain very similar to those in the final model.

Our indirect media effects model provides a much richer understanding of how the goals of antismoking message campaigns should be set and achieved. One obvious implication is to attend to campaign factors that may produce unexpected effects. Rather than depend on a direct influence of campaigns on audiences' attitude and behavior change, media campaigners should understand and cultivate the mediating mechanisms through which such messages might reach audiences in the desired way. More specifically, our model suggests that antismoking media campaigns may be designed in ways to reinforce the perception that antismoking messages make their proximal peers want to avoid smoking. In addition, given the finding that ever-smokers are more strongly influenced than never-smokers by the perception that antismoking messages make their proximal peers want to avoid smoking, the evidence suggests that such design should especially target ever-smokers even more than never-smokers. These reinforcement strategies may be more practical than efforts to correct people's misperceptions or than the training of people on how to resist peer norms. This approach is also supported by evidence that to resist social norms and to fortify human nature against erroneous judgment—even when sufficient and credible information is provided—are difficult tasks (David et al., 2004; Paek et al., 2005).

It should be noted that our model, although well-supported empirically, is only one candidate among many possible mediating mechanisms. As some scholars have urged, more effort should be made to find and refine mediating mechanisms of this sort (e.g., Wakefield et al., 2003). Understanding people's tendency to make biased judgments about others and knowing how to make use of this understanding could help to identify causal mechanisms and thus construct more effective prosocial campaigns.

Appendix A

Correlations of the Variables Among Nonsmokers (*n* = 902)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	1.00																				
2	.58	1.00																			
3	.39	.52	1.00																		
4	.47	.48	.50	1.00																	
5	.51	.51	.42	.54	1.00																
6	.58	.43	.36	.47	.52	1.00															
7	.65	.55	.42	.51	.56	.70	1.00														
8	.10	.00	.00	.03	.09	.14	.12	1.00													
9	.12	-.01	-.05	.01	.09	.14	.12	.65	1.00												
10	.08	.08	.05	.06	.07	.07	.06	-.11	-.14	1.00											
11	.08	.07	.04	.04	.09	.09	.06	-.13	-.14	.75	1.00										
12	.06	.06	.04	.02	.07	.06	.05	-.10	-.11	.76	.78	1.00									
13	.06	.05	.03	.05	.08	.06	.06	-.12	-.14	.72	.76	.78	1.00								
14	.06	.08	.03	.07	.09	.07	.07	-.16	-.18	.67	.75	.72	.83	1.00							
15	.03	.09	.05	.08	.11	.08	.04	-.14	-.14	.28	.28	.26	.28	.30	1.00						
16	.06	.11	.15	.09	.11	.05	.08	-.16	-.20	.25	.25	.25	.26	.28	.56	1.00					
17	.05	.10	.09	.08	.11	.06	.06	-.14	-.16	.28	.32	.28	.28	.33	.63	.59	1.00				
18	.07	.13	.09	.11	.12	.06	.08	-.17	-.18	.26	.28	.24	.27	.27	.55	.65	.58	1.00			
19	.04	.10	.01	.02	.01	.03	.04	-.06	.05	.01	.02	.05	.02	.04	.04	.01	.04	.01	1.00		
20	-.05	-.01	.02	.05	.03	.04	.05	-.05	-.07	.02	.00	.00	.00	.03	.02	.01	.02	-.04	.01	1.00	
21	.03	.12	.12	.07	.04	.04	.04	-.18	-.14	.12	.12	.10	.08	.07	.08	.15	.09	.14	.03	-.06	1.00

Note: Variable names: 1. Antismoking messages on TV; 2. Antismoking messages on the radio; 3. Antismoking messages on the Internet; 4. Anti-smoking messages in magazines; 5. Anti-smoking messages on TV; 6. Perceived exposure of other peers to antismoking messages; 7. Perceived exposure of close friends to antismoking messages; 8. Perceived effects of antismoking messages on other peers; 9. Perceived effects of antismoking messages on close friends; 10. How do you feel about smoking (grown-up); 11. How do you feel about smoking (good-looking); 12. How do you feel about smoking (exciting); 13. How do you feel about smoking (cool); 14. How do you feel about smoking (has friends); 15. Behavioral intention (experiment with cigarettes in future?); 16. Behavioral intention (smoke a cigarette at anytime during the next year); 17. Behavioral intention (Will you be smoking cigarettes 5 years from now); 18. Behavioral intention (If your best friend offered you a cigarette, would you smoke it); 19. Gender (female); 20. race (minority); 21. Grade (sixth-eighth grade or higher).

Appendix B

Correlations of the Variables Among Trial Smokers ($n = 391$)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	1.00																				
2	.56	1.00																			
3	.37	.45	1.00																		
4	.45	.45	.51	1.00																	
5	.34	.40	.40	.51	1.00																
6	.51	.43	.36	.50	.48	1.00															
7	.50	.51	.41	.53	.49	.64	1.00														
8	.11	.02	.12	.08	.04	.12	.13	1.00													
9	.09	.06	.09	.11	.09	.17	.16	.56	1.00												
10	.04	.07	-.01	.05	.03	.04	.02	-.14	-.30	1.00											
11	.02	.08	.00	.03	.03	.06	.01	-.05	-.24	.71	1.00										
12	.04	.08	.00	.06	.04	.06	.04	-.13	-.33	.73	.79	1.00									
13	.02	.05	.01	.01	.02	.06	.03	-.13	-.32	.72	.75	.83	1.00								
14	.00	.01	-.02	-.01	.02	.03	.02	-.06	-.26	.67	.74	.75	.81	1.00							
15	.06	.09	.05	.06	.01	.07	-.01	-.07	-.30	.46	.46	.46	.47	.42	1.00						
16	.10	.14	.02	.11	.05	.11	.07	-.12	-.36	.48	.45	.50	.50	.47	.71	1.00					
17	.10	.08	.04	.06	.01	.07	.01	-.13	-.30	.47	.43	.49	.46	.44	.67	.68	1.00				
18	.03	.07	.00	.07	.02	.05	.03	-.16	-.39	.53	.46	.51	.51	.47	.65	.73	.66	1.00			
19	.03	.01	-.01	.03	-.03	.04	.03	.12	.16	.06	.06	.07	.05	.06	.06	.11	.01	.01	1.00		
20	.02	.01	-.03	.07	.15	.03	.03	-.02	.03	-.04	-.10	-.03	-.08	-.05	-.07	-.04	-.05	-.05	.09	1.00	
21	.08	.21	.10	.16	.10	.11	.14	-.09	-.13	.03	.06	.04	.05	.06	.01	.14	.03	.17	-.08	-.01	1.00

Note: Variable names: 1. Antismoking messages on TV; 2. Antismoking messages on the radio; 3. Antismoking messages on the Internet; 4. Antismoking messages in magazines; 5. Antismoking messages on TV; 6. Perceived exposure of other peers to antismoking messages; 7. Perceived exposure of close friends to antismoking messages; 8. Perceived effects of antismoking messages on other peers; 9. Perceived effects of antismoking messages on close friends; 10. How do you feel about smoking (grown-up); 11. How do you feel about smoking (good-looking); 12. How do you feel about smoking (exciting); 13. How do you feel about smoking (cool); 14. How do you feel about smoking (has friends); 15. Behavioral intention (experiment with cigarettes in future?); 16. Behavioral intention (smoke a cigarette at anytime during the next year); 17. Behavioral intention (Will you be smoking cigarettes 5 years from now); 18. Behavioral intention (If your best friend offered you a cigarette, would you smoke it); 19. Gender (female); 20. race (minority); 21. Grade (sixth-eighth grade or higher).

Notes

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2. In this study, we decided to introduce and consistently use the concept of peer proximity because the concept is drawn from, and thus, more directly related to the peer influence literature.

3. We first assessed our data with a chi-square goodness-of-fit test. Because this test is sensitive to even small amounts of misfit when sample size is large, several goodness-of-fit indexes were also computed, including the Root-Mean-Square-Error of Approximation (RMSEA), the Non-Normed Fit Index (NNFI, equivalent to Tucker-Lewis Index), Standardized Root-Mean-Square Residual (SRMR), and the Comparative Fit Index (CFI).

4. Our findings indicate that, for nonsmokers ($N = 902$), adolescents in lower grades and Whites tend to perceive more influence on close and distant peers than those with higher grades and non-Whites. Non-Whites have more favorable attitudes toward smoking and higher smoking intention than Whites. Gender was not significantly associated with any of the endogenous variables. For smokers ($N = 392$), boys tend to perceive more media influence on close peers and to have more favorable attitudes toward smoking than girls. Non-White adolescents report more exposure to antismoking messages and perceive more media influence on close peers than White adolescents. Grade was not significantly associated with any of the endogenous variables.

5. As a part of the \$246 billion agreement in 1998, for instance, big tobacco companies agreed to spend \$1.5 billion over 5 years to fund new foundations' educational campaigns against smoking (Wakefield et al., 2003).

6. This baseline third-person perception hypothesis is specific to messages that are seen to be socially undesirable. This contingency has been termed the negative influence corollary (Gunther & Storey, 2003).

References

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211.
- Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice Hall.
- Aloise-Young, P. A., Graham, J. W., & Hansen, W. B. (1994). Peer influence on smoking initiation during early adolescence: A comparison of group members and group outsiders. *Journal of Applied Psychology*, 79(2), 281-287.
- American Lung Association. (2003). *Adolescent smoking statistics*. Retrieved October 9, 2004, from <http://www.lungusa.org/site/pp.asp?c=dvLUK9O0E&b=39868>
- Andrews, J. A., Tildesley, E., Hops, H., & Li, F. Z. (2002). The influence of peers on young adult substance use. *Health Psychology*, 21, 349-357.
- Baer, J. S., Stacy, A., & Larimer, M. (1991). Biases in the perception of drinking norms among college students. *Journal of Studies on Alcohol*, 52, 580-586.
- Bearman, P. S. (2002). *Social network context and adolescent STD risk*. New York: Institute for Social and Economic Research and Policy, Columbia University.
- Bearman, P. S., & Bruckner, H. (1999). *Peer effects on adolescent girls' sexual debut and pregnancy*. Washington, DC: National Campaign to Prevent Teen Pregnancy.
- Bearman, P. S., Bruckner, H., Brown, B. B., Theobald, W., & Philliber, S. (1999). *Peer potential: Making the most of how teens influence each other*. Washington, DC: National Campaign to Prevent Teen Pregnancy.
- Brown, B. B. (1990). Peer groups and peer cultures. In S. S. Feldman & G. R. Elliot (Eds.), *At the threshold: The developing adolescent* (pp. 171-196). Cambridge, MA: Harvard University Press.

- Buhrmester, D., & Furman, W. (1987). The development of companionship and intimacy. *Child Development*, 58, 1101-1113.
- Bush, P. J., & Iannotti, R. J. (1985). The development of children's health orientations and behaviors: Lessons for substance abuse prevention. In C. L. Jones & R. J. Battjes (Eds.), *Etiology of drug abuse*. Washington, DC: U.S. Government Printing Office.
- Chia, S. C. (2006). How peers mediate media influence on adolescents' sexual attitudes and sexual behavior. *Journal of Communication*, 56, 585-606.
- Cialdini, R. B. (1993). *Influence: The psychology of persuasion*. New York: Quill William Morrow.
- Cohen, J., Mutz, D., Price, V., & Gunther, A. C. (1988). Perceived impact of defamation: An experiment on third-person effects. *Public Opinion Quarterly*, 52, 161-173.
- Clasen, D. R., & Brown, B. B. (1985). The multidimensionality of peer pressure in adolescence. *Journal of Youth and Adolescence*, 14(6), 451-468.
- Crockett, L., Losoff, M., & Petersen, A. (1984). Perceptions of the peer group and friendship in early adolescence. *Journal of Early Adolescence*, 4, 155-181.
- David, P., Liu, K., & Myser, M. (2004). Methodological artifact or persistent bias? Testing the robustness of the third-person and reverse third-person effects for alcohol messages. *Communication Research*, 31(2), 206-233.
- Duck, J. M., Terry, D. J., & Hogg, M. G. (1995). The perceived influence of aids advertising: 3rd-person effects in the context of positive media content. *Basic and Applied Social Psychology*, 17(3), 305-325.
- Ellickson, P. L., Tucker, J. S., & Klein, D. J. (2001). High-risk behaviors associated with early smoking: results from a 5-year follow-up. *Journal of Adolescent Health*, 28, 465-473.
- Farrelly, M. C., Davis, K. C., Haviland, M. L., Heaton, C. G., & Messeri, P. (2005). Evidence of a dose-response relationship between "truth" antismoking ads and youth smoking prevalence. *American Journal of Public Health*, 95, 425-431.
- Farrelly, M. C., Heaton, C. G., Davis, K. C., Messeri, P., Hersey, J. C., & Haviland, M. L. (2002). Getting to the truth: Evaluating national tobacco countermarketing campaigns. *American Journal of Public Health*, 92, 901-907.
- Festinger, L. (1954). A theory of social comparison processes. *Human Relations*, 7, 117-140.
- Fishbein, M., Jamieson, K. H., Zimmer, E., von Haefen, I., & Nabi, R. (2002). Avoiding the boomerang: Testing the relative effectiveness of antidrug public service announcements before a national campaign. *American Journal of Public Health*, 92(2), 238-245.
- Graham, J. W., Marks, G., & Hansen, W. B. (1991). Social influence processes affecting adolescent substance use. *Journal of Applied Psychology*, 76, 291-298.
- Grandpre, J., Alvaro, E. M., Burgoon, M., Miller, C. H., & Hall, J. R. (2003). Adolescent reactance and anti-smoking campaigns: A theoretical approach. *Health Communication*, 15, 349-366.
- Gunther, A. C. (1998). The persuasive press inference: Effects of mass media on perceived public opinion. *Communication Research*, 25, 486-504.
- Gunther, A. C., Bolt, D., Borzekowski, D. L. G., Liebhart, J. L., & Dillard, J. P. (2006). Presumed influence on peer norms: How mass media indirectly affect adolescent smoking. *Journal of Communication*, 56, 52-68.
- Gunther, A. C., & Christen, C. T. (1999). Effects of news slant and base rate information on perceived public opinion. *Journalism & Mass Communication Quarterly*, 76, 277-292.
- Gunther, A. C., Christen, C. T., Liebhart, J. L., & Chia, S. C. (2001). Congenial public, contrary, press, and biased estimates of the climate of opinion. *Public Opinion Quarterly*, 65, 295-320.
- Gunther, A. C., & Mundy, P. (1993). Biased optimism and the third-person effect. *Journalism Quarterly*, 70(1), 58-67.
- Gunther, A. C., & Storey, J. D. (2003). The influence of presumed influence. *Journal of Communication*, 53, 199-215.
- Gunther, A. C., & Thorson, E. (1992). Perceived persuasive effects of product commercials and public-service announcements: Third-person effects in new domains. *Communication Research*, 19(5), 574-596.
- Hansen, W., & Graham, J. W. (1991). Preventing alcohol, marijuana, and cigarette use among adolescents: One year results of the Adolescent Alcohol Prevention Trial. *Preventive Medicine*, 20, 414-430.

- Harris, J. R. (1995). Where is the child's environment? A group socialization theory of development. *Psychological Review*, 102(3), 458-489.
- Henriksen, L., & Flora, J. A. (1999). Third-person perception and children—Perceived impact of pro- and anti-smoking ads. *Communication Research*, 26(6), 643-665.
- Henry, K. L., Slater, M. D., & Oetting, E. R. (2005). Alcohol use in early adolescence: The effect of changes in risk taking, perceived harm and friends' alcohol use. *Journal of Studies on Alcohol*, 66, 275-283.
- Hyman, H., & Sheatsley, P. (1947). Some reasons why information campaigns fail. *Public Opinion Quarterly*, 11, 412-423.
- Hyman, H., & Singer, E. (Eds.). (1968). *Readings in reference group theory and research*. New York: Free Press.
- Iannotti, R. J., & Bush, P. J. (1992). Perceived vs. actual friends' use of alcohol, cigarettes, marijuana, and cocaine: Which has the most influence? *Journal of Youth and Adolescence*, 21, 375-389.
- Inhelder, B., & Piaget, J. (1958). *The growth of logical thinking from childhood to adolescence*. New York: Basic Books.
- Jöreskog, K., & Sörbom, D. (1996). *LISREL 8: User's reference guide*. Chicago: Scientific Software.
- Kirke, D. M. (2004). Chain reactions in adolescents' cigarette, alcohol and drug use: similarity through peer influence or the patterning of ties in peer networks? *Social Networks*, 26(1), 3-28.
- Maxwell, K. A. (2002). Friends: The role of peer influence across adolescent risk behaviors. *Journal of Youth and Adolescence*, 31, 267-277.
- McLeod, D. M., Eveland, W. P., & Nathanson, A. I. (1997). Support for censorship of violent and misogynic rap lyrics: An analysis of the third-person effect. *Communication Research*, 24(2), 153-174.
- Meltzer, W. (2003). Up front. *Journal of Health Communication*, 8, 101-105.
- Menashe, C. L., & Siegel, M. (1998). The power of a frame: An analysis of newspaper coverage of tobacco issues—United States, 1985-1996. *Journal of Health Communication*, 3, 307-325.
- Milkie, M. A. (1999). Social comparisons, reflected appraisals, and mass media: The impact of pervasive beauty images on black and white girls' self-concepts. *Social Psychological Quarterly*, 62, 190-210.
- Millstein, S. G. (1993). A view of health from the adolescent's perspective. In S. G. Millstein, A. C. Peterson, & E. O. Nightingale (Eds.), *Promoting the health of adolescents: New directions for the twenty-first century* (pp. 97-118). New York: Oxford University Press.
- Moscovici, S. (1985). Social influence and conformity. In G. Lindzey & E. Aronson (Eds.), *Handbook of social psychology: Special fields and applications* (pp. 347-412). New York: Random House.
- Murray, D. M., Perry, C. L., & Griffin, G. (1992). Results from a state-wide approach to adolescent tobacco use prevention. *Preventive Medicine*, 82, 449-472.
- Murray, D. M., Prokhorov, A. V., & Harty, K. C. (1994). Effects of a state-wide antismoking campaign on mass media messages and smoking beliefs. *Preventive Medicine*, 23, 54-60.
- Neuwirth, K., Frederick, E., & Mayo, C. (2002). Person-effects and heuristic-systematic processing. *Communication Research*, 29(3), 320-359.
- Nisbett, R., & Ross, L. (1980). *Human inference: Strategies and shortcomings of social judgment*. Englewood Cliffs, NJ: Prentice Hall.
- Paek, H.-J. (2006, August). *Adolescent pre- and post-orientations that determine antismoking campaign effectiveness: Applying O-S-O-R model*. Paper presented at the Association for Education in Journalism and Mass Communication Annual Conference, San Francisco.
- Paek, H.-J. & Gunther, A. (2006, April). *Roles of peer perceptions in the effects of antismoking campaigns: An exploration of mediating mechanisms with two-wave panel analysis*. Paper presented at the annual conference of the American Advertising Association in Reno, Nevada.
- Paek, H.-J., Pan, Z., Sun, Y., Abisaid, J., & Houden, D. (2005). The third-person perception as social judgment: An exploration of social distance and uncertainty reduction in perceived effects of political attack ads. *Communication Research*, 32, 143-170.
- Peterson, A. V., Kealey, K. A., Mann, S. L., Marek, P. M., & Sarason, I. G. (2000). Hutchinson smoking prevention project: Long-term randomized trial in school-based tobacco use prevention-results on smoking. *Journal of the National Cancer Institute*, 92, 1979-1991.

- Prentice, D. A., & Miller, D. T. (1993). Pluralistic ignorance and alcohol use on campus: Some consequences of misperceiving the social norm. *Journal of Personality & Social Psychology*, 64, 243-256.
- Randolph, W., & Viswanath, K. (2004). Lessons learned from public health mass media campaigns: Marketing health in a crowded media world. *Annual Review of Public Health*, 25, 419-437.
- Ross, M., & Fletcher, J. G. O. (1985). Attribution and social perception. In G. Lindzey & E. Aronson (Eds.), *Handbook of social psychology* (Vol. 2, pp. 73-122). New York: Random House.
- Sherif, M., & Sherif, C. W. (1964). *Reference groups: exploration into conformity and deviation of adolescents*. New York: Harper & Row.
- Slater, M. D. (2004). Operationalizing and analyzing exposure: The foundation of media effects research. *Journalism & Mass Communication Quarterly*, 81(1), 168-183.
- Stephenson, M. T., & Palmgreen, P. (2001). Sensation seeking, perceived message sensation value, personal involvement, and processing of anti-marijuana PSAs. *Communication Monographs*, 68(1), 49-71.
- Sussman, S., Dent, C. W., Mestel-Rauch, J., Johnson, C. A., Hansen, W. B., & Flay, B. R. (1988). Adolescent nonsmokers, triers, and regular smokers' estimates of cigarette smoking prevalence: When do overestimations occur and by whom? *Journal of Applied Social Psychology*, 18, 537-551.
- Turner, J. C. (1991). *Social influence*. Pacific Grove, CA: Cole.
- Tversky, A., & Kahneman, D. (1971). Belief in law of small numbers. *Psychological Bulletin*, 76(2), 105-110.
- Urberg, K. A. (1992). Locus of peer influence: Social crowd and best friend. *Journal of Youth and Adolescence*, 21(4), 439-450.
- Wakefield, M., Flay, B., Nichter, M., & Giovino, G. (2003). Effects of anti-smoking advertising on youth smoking: A review. *Journal of Health Communication*, 8, 229-247.
- Wakefield, M., Terry-McElrath, Y., Emery, S., Saffer, H., Chaloupka, F. J., Szczypka, G., et al. (2006). Effect of televised, tobacco company-funded smoking prevention advertising on youth smoking-related beliefs, intentions, and behavior. *American Journal of Public Health*, 96, 2154-2160.
- Wartella, E. A., & Stout, P. A. (2002). The evolution of mass media and health persuasion models. In W. D. Crano & M. Burgoon (Eds.), *Mass media and drug prevention: Classic and contemporary theories and research* (pp. 19-34). Mahwah, NJ: Lawrence Erlbaum Associates.
- Weiss, C. S., Nesselhof-Kendall, S. E. A., Fleck-Kandath, C., & Baum, A. (1990). Psychosocial aspects of AIDS prevention among heterosexuals. In J. Edwards, R. S. Tindale, L. Heath, & E. J. Posavac (Eds.), *Social influence processes and prevention* (pp. 15-38). New York: Plenum Press.
- Wolburg, J. M. (2004). Misplaced marketing: The need for new anti-smoking advertising strategies that do not provoke smoker defiance. *Journal of Consumer Marketing*, 21(3), 173-174.
- Yanovitzky, I., Stewart, L. P., & Lederman, L. C. (2006). Social distance, perceived drinking by peers, and alcohol use by college students. *Health Communication*, 19, 1-10.

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