

What to Convey in Antismoking Advertisements for Adolescents: The Use of Protection Motivation Theory to Identify Effective Message Themes

Antismoking advertising is increasingly used, but its message content is controversial. In an initial study in which adolescents coded 194 advertisements, the authors identified seven common message themes. Using protection motivation theory, the authors develop hypotheses regarding the message theme effects on cognitions and intentions and test them in an experiment involving 1667 adolescents. Three of the seven message themes increased adolescents' nonsmoking intentions compared with a control; all did so by enhancing adolescents' perceptions that smoking poses severe social disapproval risks. Other message themes increased health risk severity perceptions but were undermined by low perceived vulnerability.

There is considerable agreement that programs should be undertaken to prevent minors from smoking cigarettes (Centers for Disease Control and Prevention [CDC] 1999). The number of U.S. states that use paid anti-smoking advertising targeted at youths has increased from 1 in 1986 (Minnesota Department of Health 1991) to more than 21 in 2002 (Campaign for Tobacco-Free Kids 2002). Also, the American Legacy Foundation (2002) runs anti-smoking television advertisements nationwide. Funding primarily comes from the 1997 settlement between tobacco firms and the U.S. attorneys general (National Association of Attorneys General 2000). The sponsors of antismoking advertising use diverse message themes, and though there is widespread agreement that choice of theme matters, there is considerable disagreement as to what choice to make. As Teinowitz (1998, p. C1) explains,

Do you warn teens, many of whom think they are invincible, about death and disfigurement? Or do you suggest that Big Tobacco is the new evil empire ... or that not smoking is much cooler than engaging in it? If you think the answer is obvious, you haven't seen the distinctly different approaches taken by the four states that have recently run anti-smoking ad campaigns.... History shows you get less

smoking but how much less will depend, to a large degree, on the message used.

Evidence of the efficacy of different antismoking message themes is limited and conflicting. A report by Teenage Research Unlimited (1999) concludes that health messages are efficacious, whereas Goldman and Glantz (1998) advocate messages attacking the tobacco industry and Worden, Flynn, and Secker-Walker (1998) recommend social norm messages. Many of these conclusions are based on focus group research, which can be unreliable (Blankenship and Breen 1993), as can uncontrolled field studies. Florida has reported that its "Truth" advertisements attacking tobacco firms are effective, on the basis of surveys showing 40% and 16% declines in smoking among middle and high school students in the state, respectively (Bauer et al. 2000; see also Farrelly et al. 2002). However, Monitoring the Future (Johnston, O'Malley, and Bachman 2001) shows nearly comparable declines (30% and 14%) in the southern region of the United States as a whole, where no antismoking advertisements were running. Apparently, most of the decline was due to a macro trend, rather than to an advertisement-specific effect. Therefore, it is unclear whether anti-tobacco industry advertisements work.

The most fundamental question that must be addressed is whether using any of the common antismoking messages makes sense from a public health perspective, compared with doing nothing at all (Pechmann 2002). That is, will any of these message themes dissuade youths from smoking? To address this question, we examined 194 antismoking advertisements and created a typology of commonly used message themes. Then, we conducted an experiment to investigate the effects of each message theme on adolescents' smoking-related cognitions and intentions compared with a no-message control. We employed protection motivation theory (Rogers 1983) to help us predict why certain message themes might work or not work, because it is a highly com-

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prehensive theory of health communication (Boer and Seydel 1996). Moreover, the antismoking advertisement sponsors sought to influence many of the cognitions that are the focus of this theory (Parpis 1997). Although our research primarily addresses social marketing, it also explores the broader issue of how youths make decisions about risky behaviors (Benthin, Slovic, and Severson 1993; Fischhoff et al. 2000). In particular, we examine the weight placed on health versus social risks (Ho 1998) and the integration of data about risk severity versus vulnerability (Weinstein 2000).

Protection Motivation Theory

Protection motivation theory (Rogers 1983) posits that people's motivations or intentions to protect themselves from harm are enhanced by four critical cognitions or perceptions, regarding the severity of the risks, vulnerability to the risks, self-efficacy at performing the advocated risk-reducing behavior, and the response efficacy of the advocated behavior. In addition, the theory posits that people's intentions to protect themselves are weakened by the perceived costs of the advocated risk-reducing behavior and the perceived benefits of the opposing risk-enhancing behavior. These cognitive processes are divided into two subprocesses: threat appraisal (severity, vulnerability, and benefits) and coping appraisal (self-efficacy, response efficacy, and costs). In general, the factors underlying each appraisal process have been studied separately, though occasionally threat or coping appraisal has been studied as a whole (Sturges and Rogers 1996; Tanner, Hunt, and Eppright 1991). According to the theory, people can be motivated to engage in desirable health behaviors not only to avoid health risks but also to avoid social or interpersonal risks (Rogers 1983). Of late, researchers have increasingly focused on messages that stress social risks (Dijkstra, De Vries, and Roijackers 1998; Mahler et al. 1997; Schoenbachler and Whittler 1996). Furthermore, protection motivation theory has recently been extended formally to include social risks (Ho 1998). Some researchers have argued that cognitive mediators are insufficient for explaining people's intentions to avoid risks and that fear should be included as an added affective mediator (Tanner, Hunt, and Eppright 1991; Witte 1992). Rogers (1983, p. 165) disagrees, however, and cites his results showing that "fear arousal does not facilitate attitude change unless this arousal directly affects ... cognitive appraisal."

Protection motivation theory (Rogers 1975, 1983) posits that, in most cases, cognitions will affect intentions directly and additively, though at times, certain cognitions will function interactively or synergistically. The 1975 version of the theory posits two- and three-way interactions among severity, vulnerability, and efficacy. The 1983 version of the theory excludes all three-way interactions, as well as the two-way interactions of severity with vulnerability and self-efficacy with response efficacy. However, a recent meta-analysis (Floyd, Prentice-Dunn, and Rogers 2000) suggests that these two-way interactions may be important after all (see also Weinstein 2000).

Researchers have sometimes tested protection motivation theory using surveys. They have measured all the cog-

nitive variables and intentions and examined the cognition-intentions links (e.g., Flynn, Lyman, and Prentice-Dunn 1995; Ho 1998). More commonly, though, researchers have conducted experiments in which they have manipulated a subset of the cognitive factors through social marketing messages, frequently using real messages from practitioners, as we do here (Burgess and Wurtele 1998; Castle, Skinner, and Hampson 1999; Steffen 1990; Weinstein, Sandman, and Roberts 1991). They have examined the effects of these messages on the target cognitions and intentions, often compared with a no-message control group (Mahler et al. 1997; Tanner, Hunt, and Eppright 1991; Witte 1992). This is the approach we adopt. To our knowledge, no experiment has sought to manipulate all six protection motivation theory cognitions because doing so would be too unwieldy, particularly given a standard full-factorial design. The perceived costs of the risk-reducing behavior and the perceived benefits of the risk-enhancing behavior have been studied the least (Floyd, Prentice-Dunn, and Rogers 2000; Milne, Sheeran, and Orbell 2000), perhaps because these factors weaken protection motivation intentions, and researchers have pragmatically focused on factors that strengthen intentions.

In this research, we use protection motivation theory to formulate hypotheses regarding the likely impact of seven common antismoking message themes on the cognitions that they attempt to influence, namely, health and social risk severity and self-efficacy at refusing cigarette offers and resisting tobacco marketing. In formulating these hypotheses, we review prior experiments to assess "cognitive malleability," or the ease with which severity and efficacy perceptions can be influenced. Furthermore, we assess the likelihood that if a message theme affects a cognition, it will also affect intentions. Here, we refer to meta-analysis results regarding the average effect size of each cognition on intentions (Floyd, Prentice-Dunn, and Rogers 2000; Milne, Sheeran, and Orbell 2000). In considering effects on intentions, we also examine possible two-way interactions between cognitions, because a cognitive variable could have a weak effect on intentions as a result of a moderator that reduces, nullifies, or even at times reverses its impact (Rogers 1975, 1983). We studied all of the protection motivation theory cognitions except response efficacy, which we presumed to be irrelevant in this context, because refraining from smoking is 100% effective for avoiding the risks incurred by becoming a smoker.

Hypotheses Regarding the Effects of Message Themes on Cognitions

Disease and Death Message Theme

Disease and Death messages discuss how smokers suffer from serious diseases, such as emphysema and lung cancer, and often die prematurely. The goal of these advertisements is to convey the "harsh medical realities of the effects of smoking" (Parpis 1997, p. 35). In one stimulus advertisement used in our study, a camera follows smoke going down the throat of an adult smoker, which reveals fleshy lumps starting to grow; a voice-over states, "One damaged cell is

all it takes to start lung cancer growing.” Another advertisement talks about how smokers inhale poisons such as “arsenic, carbon monoxide, and formaldehyde” that “immediately affect their hearts, lungs, and brains.” A third advertisement shows an adolescent male smoking, who slowly turns into a skeleton; it states, “Smoking: it’s only a matter of time.”

From the perspective of protection motivation theory (Rogers 1983), the intent is to increase perceptions of health risk severity. Prior studies have used similar manipulations to increase the perceived severity of unhealthy behaviors such as smoking (Maddux and Rogers 1983), unprotected sex (Block and Keller 1998), illicit drug use (Schoenbachler and Whittler 1996), and alcohol abuse (Kleinot and Rogers 1982). Manipulating health risk severity seems fairly easy to do through brief text or graphics, as in a brochure stating that unprotected sex can cause AIDS or syphilis (Block and Keller 1998) or a graphic print advertisement showing a person in a hospital who has overdosed on a drug (Schoenbachler and Whittler 1996).

We did not expect the Disease and Death messages to affect health risk vulnerability perceptions, however. These messages included none of the information that is known to enhance vulnerability perceptions, such as personal or genetic risk factors (Rippetoe and Rogers 1987; Weinstein 1983; Wurtele and Maddux 1987), probabilities of occurrence (Maddux and Rogers 1983; Mulilis and Lippa 1990), or familiar symptoms (DePalma, McCall, and English 1996). Instead, we predicted a single effect for Disease and Death messages on cognitions.

H₁: The Disease and Death (versus control) antismoking message theme will enhance adolescents’ perceptions of the severity of the health risks of smoking.

Endangers Others Message Theme

Endangers Others messages stress how secondhand smoke, and smoking in general, can seriously harm smokers’ family members, coworkers, and peers. The primary intent of these advertisements is “raising individuals’ awareness of environmental tobacco smoke (ETS), with advertisements that portray the risks of breathing someone else’s smoke” (California Department of Health Services [CA DHS] 2001, p. 84). Some advertisements also stress that when smokers die prematurely, family members suffer emotionally and financially. In one stimulus advertisement, an uncaring father’s cigarette smoke envelops his frightened toddler who, in a plea for help, spells out “sudden infant death syndrome” in alphabet blocks. Another advertisement shows smoke entering rooms in a home with children and states, “Your children don’t smoke and they don’t want to; but when your home fills with second hand smoke, they don’t have a choice; instead, every innocent breath they take eats away at them, causing asthma. . . .” In yet another advertisement, a teenager sadly explains that her mother has died of a smoking-related disease and will never attend her graduation or wedding: “All the important stuff, she won’t be there.”

Endangers Others advertisements are similar to Disease and Death advertisements in terms of depicting severe health risks. What is unique about Endangers Others advertisements is that they also convey that smokers may

encounter strong social disapproval from nonsmokers. The advertisements suggest that many nonsmokers are disappointed in or angry at smokers for their lack of consideration of others. Some advertisements also subtly chastise smokers for hurting others. Surveys have found that Endangers Others advertising often prompts nonsmokers to voice their disapproval of smoking by asking the smokers in their midst—for example, family members or friends—not to smoke around them or even to stop smoking altogether (CA DHS 2001; Connolly and Robbins 1998).

According to protection motivation theory, Endangers Others messages seek to increase the perceived severity of the health and social disapproval risks of smoking. On the basis of prior studies, it appears to be fairly easy to manipulate social risk severity perceptions (Jones and Leary 1994; Mahler et al. 1997), just as it is with health risk severity perceptions. Schoenbachler and Whittler (1996) used a print advertisement showing young people rejecting a teenage drug user. Dijkstra, De Vries, and Roijackers (1998) sent letters to smokers stating that their family members would appreciate it if they quit. Therefore, we predict that

H₂: The Endangers Others (versus control) antismoking message theme will enhance adolescents’ perceptions of (a) the severity of the health risks and (b) the severity of the social disapproval risks of smoking.

Cosmetics Message Theme

Cosmetics messages stress that smokers must cope with highly unattractive and annoying side effects that are cosmetic in nature, such as smelliness. The messages attempt to convey that “smoking has many unpleasant consequences that can lead to social disapproval, such as bad breath, yellow teeth, smelling bad” (Minnesota Department of Health 1991, p. 52). In one stimulus advertisement, a teen compares a smoker’s breath to a dog’s breath and concludes that the latter “is slightly less putrid.” In another advertisement, a teen offers strategies to enhance guys’ attractiveness to girls and warns, “Nix the smoking; that yellow teeth and cigarette stench thing; it’s not working.” In a third advertisement, youths brush their teeth after smoking but find that their mouths are full of ashes; the advertisement warns, “You can brush, you can gargle, but you can’t get rid of cigarette mouth.”

From the perspective of protection motivation theory, Cosmetics messages attempt to enhance perceptions that smoking poses severe social disapproval risks because of its unattractive side effects. However, it is possible that adolescents might not be too concerned about such problems, which cosmetic products such as breath sprays and gums can easily remedy. In most prior studies that enhanced perceptions of social risk severity, the messages stressed appearance-related risks that cosmetics products could not remedy, such as curvature of the spine from osteoporosis (Klohn and Rogers 1991) or wrinkles from excessive sun exposure (Jones and Leary 1994). The Endangers Others messages seem to convey more serious social concerns as well, by stressing that many nonsmokers believe that smoking is inconsiderate and violates their right to breathe clean air. However, given adolescents’ hypersensitivity to being evaluated by others (Graham, Marks, and Hansen 1991), we predict that even Cosmetics messages will be effective.

H₃: The Cosmetics (versus control) antismoking message theme will enhance adolescents' perceptions of the severity of the social disapproval risks of smoking.

Smokers' Negative Life Circumstances Message Theme

Most adolescents want to appear mature, independent, savvy, attractive, and cool, and many think that smoking will help them realize these goals (CA DHS 1990, p. xi; see also Miller 1998). Smokers' Negative Life Circumstances messages suggest that smoking "is a barrier to achieving [these] goals" (Miller 1998, p. 2743). Specifically, the advertisements use graphic, gross, and antisocial images to convey that smoking is a hindrance, rather than a pathway, to achieving higher-order aspirational goals (Parpis 1997; Pechmann and Shih 1999). Smokers are depicted as disheveled "losers" in a variety of unattractive life circumstances, who have quite obviously taken the wrong path in life.

In one stimulus advertisement, an attractive young male demonstrates to a disheveled and befuddled smoker that smoking is as ill-conceived as sticking one's head in a toilet; "Smoke away," the advertisement jeers at the end. Another advertisement pokes fun at a sophomore who unwisely "started smoking in junior high," showing him as a scrawny old man with a whiney voice and a cigarette poking out of his mouth. One more advertisement shows a young female smoker who tries to beautify herself for a date; instead, she turns into an ugly witch sitting in a bathtub, giggling inanely. The graphic, negative imagery in Smokers' Negative Life Circumstances advertising is designed to suggest that smokers are viewed as losers and will experience severe social disapproval from peers. Translating this idea into protection motivation theory terms, we predict that

H₄: The Smokers' Negative Life Circumstances (versus control) antismoking message theme will enhance adolescents' perceptions of the severity of the social disapproval risks of smoking.

Refusal Skills Role Model Message Theme

Refusal Skills Role Model messages explain why many attractive role models view smoking as unappealing and demonstrate refusals of cigarette offers (Worden et al. 1988). In one advertisement, a girl confides to a friend, "I don't want to go out with him; he was smoking and he thought it was cool"; instead, she is impressed with another boy who says "no thanks" when offered a cigarette. A different advertisement shows kids being stalked by a cigarette, and one strong, brave boy knocks the cigarette out with boxing gloves. In yet another advertisement, a famous football player symbolically kicks a cigarette away like a football, stating, "No way was I going to lose to some tiny little cigarette."

Turning to protection motivation theory, one goal of the advertising is to increase perceptions that smoking poses social disapproval risks. The attractive role models clearly indicate that they disapprove of smoking and smokers. These role models could make quite an impression because, as was mentioned previously, social risk perceptions gener-

ally appear to be malleable (Dijkstra, De Vries, and Roijackers 1998; Jones and Leary 1994; Mahler et al. 1997; Schoenbachler and Whittler 1996). Refusal Skills Role Model advertising also attempts to enhance adolescents' perceptions of self-efficacy at refusing cigarette offers (Worden et al. 1988). The advertising shows role models successfully refusing cigarettes, which may teach skills and raise viewers' expectations that they too are capable of refusing (Bandura 1997).

However, self-efficacy perceptions have proved to be quite rigid and often cannot be changed unless intense interventions are used that permit practice and mastery of focal skills (Bandura 1997). Rohrbach and colleagues (1987) increased adolescents' feelings of self-efficacy at refusing alcohol offers with a three-hour intervention involving demonstrations and practice that progressed from simple rehearsals to extended role plays. Bryan, Aiken, and West (1996) boosted female subjects' self-efficacy regarding condom use with a multifaceted intervention including a video of condom purchases, role-playing of asking a partner to wear a condom, and demonstrations of how to put a condom on a partner. Refusal Skills Role Model advertising relies on passive observation, so we were uncertain whether it would influence self-efficacy perceptions. However, we expected the advertising to influence social risk perceptions.

H₅: The Refusal Skills Role Model (versus control) antismoking message theme (a) will enhance adolescents' perceptions of the severity of the social disapproval risks of smoking and (b) may enhance their perceptions of self-efficacy at refusing cigarette offers.

Marketing Tactics Message Theme

Marketing Tactics messages stress that tobacco firms use powerful marketing tactics such as image advertising and target marketing and that children, women, and minorities are prime targets. The advertising sponsors believe that "the strategy makes [children] stop and consider that smoking may not be an act of their own free will" (CA DHS 1990, p. 26). In one stimulus advertisement, cigarettes rain down on a schoolyard while a tobacco executive explains, "We have to sell cigarettes to your kids; we need half a million new smokers a year just to stay in business, so we advertise near schools, at candy counters.... We have to." Another advertisement features a former tobacco lobbyist who says, "Maybe they'll get to your little brother or sister, or maybe they'll get to the kid down the block, but one thing is perfectly clear to me: the tobacco companies are after children." One more advertisement shows a cigarette billboard claiming that women want "rich flavor." The billboard peels away to reveal the company's true motive: "Women are making us rich."

Marketing Tactics messages attempt to increase adolescents' knowledge about cigarette marketing tactics, including the perpetrators, target audiences, effects, and ethics. This multidimensional knowledge base has been labeled "persuasion knowledge" (Friestad and Wright 1994). Ideally, such knowledge should enhance youths' perceptions of control over tobacco marketers' persuasion attempts (Campbell and Kirmani 2000). As Friestad and Wright (1994)

explain, when a person understands that an agent's action is a persuasion attempt, a "change of meaning" occurs, wherein the person can exert control over the persuasion attempt.

In protection motivation theory terms, Marketing Tactics advertising seeks to boost adolescents' knowledge regarding tobacco marketing tactics and, ultimately, their self-efficacy at resisting such tactics. The advertising may increase knowledge, as many media literacy programs have been shown to do (Banspach, Lefebvre, and Carleton 1989; Brucks, Armstrong, and Goldberg 1988). However, it is less clear whether the advertising will enhance skills and self-efficacy, because it relies on passive observation (Bandura 1997). Media literacy programs that have improved skills typically have enabled students to practice and master those skills (Dorr, Graves, and Phelps 1980; Feshbach, Feshbach, and Cohen 1982). Consider, for example, Peterson and Lewis's (1988, p. 167) successful program:

The individual learning module for that day was defined ... and modeled by the experimenter who gave several examples.... Then, an advertisement that included the item relevant to that learning module was shown.... The rest of the session was spent with the children viewing advertisements and identifying items relevant to the present learning module, and helping the children make up their own examples.

Because watching advertising is fundamentally different from this type of program, we predict that

H₆: The Marketing Tactics (versus control) antismoking message theme may enhance adolescents' perceptions of self-efficacy at resisting tobacco marketing.

Selling Disease and Death Message Theme

Selling Disease and Death messages claim that tobacco firms use manipulation and deception to pressure consumers into purchasing a product that causes serious diseases and even death. The advertising seeks to persuade adolescents to resist tobacco marketers' tactics. As one advertising sponsor explains, youths "are quick to excuse the tobacco executives as simply doing their jobs," and so it is important to "expose the tobacco industry as different from other industries" (Miller 1998, pp. 2743-44). One advertisement features a former cigarette model who pleads with viewers in a grossly distorted voice due to throat cancer. She says, "I was a model in cigarette ads, and I convinced many young people to smoke; I hope I can convince you not to." A second advertisement shows the brother of a Marlboro Man who has died from lung cancer; he explains, "The tobacco industry used my brother ... to create an image that smoking makes you independent; don't believe it; lying there with all those tubes in you, how independent can you really be?" A third advertisement shows a woman who has lost her trachea because of smoking; she smokes from a hole in her throat and states, "They say nicotine isn't addictive; how can they say that?" These advertisements stress smoking's severe health effects. They also seek to enhance persuasion knowledge, so youths will be less influenced by tobacco marketing and feel a greater sense of control over it, which should translate into enhanced self-efficacy. On the basis of our previous assump-

tion that severity perceptions are more malleable than self-efficacy perceptions, we posit that

H₇: The Selling Disease and Death (versus control) antismoking message theme (a) will enhance adolescents' perceptions of the severity of the health risks of smoking and (b) may enhance their perceptions of self-efficacy at resisting tobacco marketing.

Substantive Variation Message Condition

In our experiment, each subject saw just one of the previously discussed message themes, which was represented by eight stimulus advertisements. We also tested a heterogeneous, or Substantive Variation, condition (Schumann, Petty, and Clemons 1990), in which subjects saw all themes, one advertisement per theme. The Disease and Death, Selling Disease and Death, and Endangers Others advertisements dealt with health risk severity. The Endangers Others, Cosmetics, Smokers' Negative Life Circumstances, and Refusal Skills Role Model advertisements dealt with social risk severity. The Marketing Tactics and Selling Disease and Death advertisements addressed self-efficacy at resisting tobacco marketing. The Refusal Skills Role Model advertisement addressed self-efficacy at refusing cigarette offers.

In the Substantive Variation condition, just one or at most two advertisements conveyed each message theme, so that the total number of stimulus advertisements could be held constant, at eight advertisements, across message conditions. Ideally, the one or two advertisements on each theme would influence the focal cognitions almost as effectively as the set of eight similar advertisements in each other message condition. Prior protection motivation studies have included substantively varied or heterogeneous message conditions and have found them to be highly effective at influencing cognitions (Sturges and Rogers 1996). For example, Maddux and Rogers (1983) find that essays that discuss health risk severity and vulnerability and self- and response efficacy enhance all four types of cognitions. On the basis of this rationale, we predict that

H₈: The Substantive Variation (versus control) antismoking message condition (a) will enhance adolescents' perceptions of the severity of the health and social disapproval risks of smoking and (b) may enhance their perceptions of self-efficacy at resisting tobacco marketing and refusing cigarette offers.

Hypotheses Regarding Effects of Cognitions on Intentions

Next, we turn to the issue of whether antismoking message themes that induce changes in adolescents' risk severity or self-efficacy cognitions will produce corresponding changes in their intentions. Meta-analyses indicate that all of the protection motivation theory cognitions significantly affect youths' and adults' intentions and behaviors (Floyd, Prentice-Dunn, and Rogers 2000; Milne, Sheeran, and Orbell 2000). However, self-efficacy perceptions seem to have at least twice as much influence as risk severity perceptions. Milne, Sheeran, and Orbell (2000) report mean effect sizes of .10 for severity and .33 for self-efficacy.

Floyd, Prentice-Dunn, and Rogers's (2000) estimates are .39 for severity and .88 for self-efficacy. Therefore, although we posited previously that severity perceptions are more malleable and more likely to be affected by antismoking advertising, self-efficacy perceptions seem to be more important in terms of influencing intentions.

It should be noted, though, that these meta-analysis results are based primarily on messages that stress health risks. The effect sizes for social disapproval risks are unknown. Recent studies suggest that young people may be more influenced by social risks than health risks (Ho 1998; Jones and Leary 1994; Schoenbachler and Whittler 1996). With regard to smoking, youths' perceptions of social norms have been found to be among the strongest predictors of their smoking intentions (Chassin et al. 1984; Collins et al. 1987; Conrad, Flay, and Hill 1991). For parsimony, though, we base our formal hypothesis on protection motivation theory (Rogers 1975, 1983), which makes no predictions regarding the relative impact of different cognitions on intentions, thus implying roughly equivalent effects for each cognition.

H₀: Adolescents' intentions not to smoke will be a positive function of perceived (a) health risk severity and vulnerability, (b) social disapproval risk severity and vulnerability, (c) self-efficacy at refusing peers' cigarette offers, and (d) self-efficacy at resisting tobacco marketing; these intentions will be a negative function of perceived (e) benefits of smoking and (f) costs of not smoking. Therefore, if antismoking advertising influences risk severity or self-efficacy perceptions (*H₁*–*H₈*), it should influence intentions too.

Meta-analyses have examined only two potential interactive effects (Floyd, Prentice-Dunn, and Rogers 2000). The joint effect of self-efficacy and response efficacy was found to have a .41 effect size, but as discussed previously, response efficacy does not seem to be relevant in the context of smoking prevention. (Not smoking is clearly an effective response for avoiding the risks of being a smoker.) Of greater interest here is that the joint effect of health risk severity and vulnerability had an effect size of .54. What is most notable is that when these variables were manipulated separately, their effect sizes were .39 and .41, respectively. The variables' combined effect might be expected to be .80 (.39 + .41), yet it was only .54, which suggests a negative synergistic effect. For example, the combined manipulation might have increased severity perceptions a great deal and vulnerability perceptions much less so. This result could be problematic, because increases in severity given low vulnerability could have null or even counterproductive effects on intentions (Mulilis and Lippa 1990).

Considerable research shows that stressing the severe health risks a behavior poses can enhance its allure by making it more thrilling or positively arousing, if perceived vulnerability is low (Benthin, Slovic, and Severson 1993; Klein 1993; Wood et al. 1995). This phenomenon has been referred to as a "forbidden fruit" reaction (Pechmann and Shih 1999). For example, the most extreme roller coaster ride often has the greatest appeal because riders can experience an intense thrill and feel brave and macho with no apparent risk to themselves. Adolescents in particular seem to be attracted to forbidden fruit, because many believe they are invulnerable to physical harm (Arnett 2000; Cohen et al.

1995; Pechmann and Shih 1999; Urberg and Robbins 1984). However, youths do not feel immune to social disapproval risks; on the contrary, most youths are hypersensitive to how peers evaluate them (Graham, Marks, and Hansen 1991; McNeal and Hansen 1999). Therefore, any forbidden fruit reaction should be restricted to health risk severity messages and should not be evoked by social risk severity messages.

H₁₀: If an antismoking (versus control) message theme enhances adolescents' perceptions of health risk severity but perceived health risk vulnerability is low, nonsmoking intentions could be weakened.

Advertisement Coding Study

Subjects and Procedure

We obtained 194 antismoking television advertisements that had aired between 1986 and 1997. Most came from Arizona, California, Canada, Massachusetts, Minnesota, or the University of Vermont, but some came from the American Cancer Society, Australia, Michigan, New Hampshire, or the U.S. CDC. We used real television advertisements because we wanted to generalize our results to such advertisements. To the best of our knowledge, only the Vermont advertisements had been pretested for message content (Worden et al. 1988). Therefore, it seemed important to conduct a preliminary study to identify advertisements that contained the focal message themes. The study involved 1129 seventh and tenth graders, representing middle school and high school, respectively.

The 194 antismoking advertisements were copied onto 24 videotapes, so that each videotape contained eight or nine randomly selected advertisements. Groups of seventh and tenth graders watched each videotape. After each advertisement was viewed twice, the videotape was paused and subjects answered a series of "yes"/"no" questions regarding its message content (see Table 1). Perceived ad effectiveness was also measured with the question, "Overall, I think this ad is effective for kids my age" (1 = "strongly disagree," 5 = "strongly agree"; Biener 2000). The other procedures were similar to those used in the main experiment.

Results

The criterion for determining if an advertisement contained a message theme was 80% or higher agreement among the roughly 45 subjects who viewed that advertisement. A total of 129 advertisements fell into one of the seven thematic message categories shown in Table 1.¹ The largest category

¹Our initial categorization scheme included two additional message themes: smoking's effect on athletic performance and youths' involvement in antismoking political activities. The athletics category yielded too few advertisements ($n = 7$) to be included. The activism category was slightly larger ($n = 10$), but it appeared that the primary goal was to encourage adamantly antismoking youths to become antismoking activists, not to deter the average youth from smoking, so we did not study this message theme. Twenty-two advertisements fell into miscellaneous combination categories, such as Selling Disease and Death plus Endangers Others, none of which were prevalent enough to study. Twenty-six advertisements did not seem to contain any clear-cut message, in that fewer than 80% of subjects responded "yes" to any of the message content questions, so these advertisements were excluded from further analyses as well.

TABLE 1
Antismoking Message Themes Tested in the Main Experiment

Message Theme Labels	Message Content	Adolescents' Agreement That Advertisements Contained Content: % (Standard Deviation)	Adolescents' Perceptions of Ad Effectiveness: Mean (Standard Deviation)
Disease and Death	Smokers suffer from health effects such as cancer, lung disease, and premature death.	92 (6.4)	3.63 (.064)
Endangers Others	Smokers endanger the health and well-being of their families and others, primarily because of secondhand smoke.	91 (6.3)	3.63 (.064)
Cosmetics	Smokers must cope with unattractive side effects, such as bad breath and smelly clothes, hair, and ashtrays.	91 (7.8)	3.42 (.065)
Smokers' Negative Life Circumstances	Smokers have adopted a grotesque, loser lifestyle and have therefore chosen the wrong life path.	91 (5.3)	3.64 (.061)
Refusal Skills Role Model	Attractive role models do not smoke because they view it as highly unappealing, and they refuse others' cigarette offers.	89 (4.5)	3.51 (.066)
Marketing Tactics	Tobacco firms use powerful tactics, such as target marketing and image advertising, to reach youths and others.	91 (5.2)	3.22* (.068)
Selling Disease and Death	Tobacco firms use manipulation and deception to sell a product that causes serious diseases and even death.	90 (4.3)	3.62 (.065)
Substantive Variation	Included advertisements from each condition to test the efficacy of a heterogeneous message approach.	92 (4.4)	3.65 (.065)

*Indicates that the designated antismoking message theme differed from the others ($p < .05$).

Notes: These results are from the advertisement coding study, when eight advertisements representing each message theme were selected at random for the main experiment.

was Selling Disease and Death, with 27 advertisements; the smallest was Marketing Tactics, with 9 advertisements. We randomly selected 8 advertisements from each message category (56 advertisements total) to be used in the main experiment. For the selected advertisements, the intersubject agreement on message content averaged 91%. We also created a Substantive Variation condition, with 2 Selling Disease and Death advertisements and 1 advertisement from each other condition (8 advertisements total). The advertisements were chosen at random so that any differences in sponsor, year, quality, or style would be randomly distributed across conditions. Each condition contained advertisements from approximately four sponsors and spanned roughly nine years of advertising. The advertisement selection procedure seems to have controlled for any major quality differences, in that subjects perceived the advertisements in each condition to be similar in terms of their effectiveness ($p > .30$), except the Marketing Tactics advertisements, which were rated as slightly weaker than the others ($p < .05$). For the selected advertisements, the average effectiveness rating was 3.5, slightly above the midpoint of 3.0.

Main Experiment

Subjects and Design

Subjects were 1667 students (46% male), consisting of 788 seventh graders (47%) and 879 tenth graders. Subjects were recruited from four middle schools and four high schools; each school contributed roughly 200 students. Schools were paid \$1,000 honorariums. Student assent and parental consent were obtained, and participation rates exceeded 90%. The schools were publicly funded and ethnically diverse and were located in middle- to lower-middle-class neighborhoods. Of the subjects, 44% were Hispanic, 35% were White, and 21% were some other ethnicity. Only 4% of the subjects were regular smokers.

The design was a between-subjects factorial with one factor, antismoking message theme, and nine manipulated levels (eight treatment, one control). We randomly assigned approximately 185 subjects to each condition. Each treatment condition consisted of eight advertisements selected randomly from among the set identified in the advertisement coding study. Using eight advertisements enabled us to

assess thematic message effects rather than individual ad effects and minimized the influence of extraneous executional factors, in that each message theme was represented by several ad executions. The control condition consisted of eight randomly selected advertisements from the Ad Council on the health and social risks of drunk driving. We copied the advertisements onto videotapes in random order. To ensure a strong manipulation, we showed each advertisement twice in succession, and there was no filler material.

Data Collection Procedures

At each school, two classrooms were equipped with rented televisions and videocassette recorders. Subjects were released from class to participate in the study and were randomly assigned to one of these classrooms. The videotape to be shown in each classroom was determined in advance through a random-number algorithm. Data collection at each school was completed in one day to minimize subject contamination. Each data collection session lasted 50 minutes. Subjects were told they would view a videotape of advertisements and then complete an anonymous survey. Subjects viewed the videotapes in groups of 25–40, and no talking was permitted. Immediately after watching the entire videotape of advertisements, subjects completed a written survey with the dependent measures. Subjects placed their completed surveys in sealed envelopes and were instructed not to discuss the study with others. Subjects in the control condition reported no problems completing a survey about smoking, perhaps because the anti-drunk driving advertisements appropriately primed them by addressing a drug-related issue.

Measures

Behavioral intentions. We derived the dependent measures from prior protection motivation studies on smoking (Maddux and Rogers 1983; Sturges and Rogers 1996) as well as surveys of adolescent tobacco and alcohol use (Bauman 1997; Grube 1997; Rose 1997). Five-point (1–5) scales were used unless otherwise stated. We assessed behavioral intentions with a previously validated three-item scale (Pierce et al. 1996): “In the future, you might smoke one puff or more of a cigarette,” “You might try out cigarette smoking for a while,” and “If one of your best friends were to offer you a cigarette, you would smoke it” (“definitely yes” to “definitely no”).

Health risk perceptions. We assessed perceived severity of and vulnerability to the health risks of smoking using nine items pertaining to dying early; contracting diseases; becoming addicted; breathing poisons; premature aging; causing others to die, get diseases, or breathe poisons; and harming babies. The health severity question asked subjects to mark each outcome they viewed as very serious. The health vulnerability question asked subjects the likelihood that they would personally experience each outcome if they smoked regularly (“sure it would not happen” to “sure it would happen”).

Social risk perceptions. To assess the perceived severity of social disapproval risks, we used five semantic differentials: “How acceptable is smoking cigarettes to your close

friends?” “How do you think your close friends feel, or would feel, about you smoking?” “How attractive would you look to others if you smoked?” “How attractive would you look to dates, or potential dates, if you smoked?” and “How well would you fit in with kids your age if you smoked?” To assess the perceived vulnerability to social disapproval risks, we asked subjects how important it was for them to look attractive to others, look attractive to dates, fit in with kids their age, and fit in at parties (“not important” to “very important”).

Efficacy, cost, and benefit perceptions. We assessed perceived self-efficacy at refusing cigarette offers with three items: “If others pressure you to smoke, you can say no, walk away, or change the subject” (“sure you cannot” to “sure you can”). We measured self-efficacy at resisting tobacco marketing with two items (same scale): “You can resist being fooled by cigarette advertisements and by cigarette promotions.” For completeness, we also assessed perceptions of the costs of not smoking on a two-item “disagree”/“agree” scale (“being made fun of,” “being looked down upon”) and the benefits of smoking on a similar four-item scale (“feel less stressed,” “feel in a good mood,” “concentrate better,” “look confident”).

Analysis of Variance Results on How Message Themes Affected Cognitions

Analysis plan and control variables. We used fixed effects analyses of variance to assess whether the antismoking (versus control) message themes affected cognitions. If there was a significant message theme effect, we conducted follow-up t-tests in which each antismoking message mean was compared with the control mean. Because we used the control mean multiple times, we used Dunn–Sidak critical t-statistics to avoid an inflated Type I error rate. Initially, sex, ethnicity, and perceived ad effectiveness were included as covariates but were dropped because they had no effect on the results. The sex and ethnicity covariates were nonsignificant, indicating that randomly assigning subjects to message conditions had ensured that the conditions were closely matched on these variables. Perceived ad effectiveness was a significant covariate, indicating that the message conditions were slightly imbalanced on this factor. Here, the Refusal Skills Role Model message theme was perceived as somewhat less effective than the other message themes ($p < .05$).² However, when we conducted the pairwise comparisons of means, we obtained the same pattern of results regardless of whether we used covariate adjusted or unadjusted means; for parsimony, we report unadjusted means.

A final control variable, grade in school, was included as a blocking factor because of concerns about possible ceil-

²Refusal Skills Role Model advertisements were rated lowest on perceived ad effectiveness in the main experiment, and Marketing Tactics advertisements were rated lowest in the advertisement coding study (Table 1). We suspect that the difference may arise because advertisements were rated in sets of eight in the main experiment and individually in the advertisement coding study. Apparently, for Refusal Skills Role Model advertisements, the whole was perceived to be less than the sum of the parts. For Marketing Tactics advertisements, the whole was perceived to be greater than the sum of the parts.

ing effects among seventh graders. We included seventh graders in the research because most smoking prevention campaigns target middle school as well as high school students (e.g., Worden et al. 1988). It is believed that the opportunity to forewarn and inoculate youths against smoking is present in middle school, before significant numbers of them have even tried a cigarette (CDC 1994; Glynn 1989). However, because the prevalence of current (i.e., past month) smoking among seventh graders is only about 4% (U.S. Department of Health and Human Services 1999), we were concerned that our seventh graders might report strong antismoking intentions or cognitions, leaving little room for improvement after exposure to antismoking advertisements. By including seventh graders, we left our options open. If it was possible to detect ad effects among this group, we would be able to do so and determine which message themes work best for them. If effects among seventh graders were masked because of ceiling effects, we could use grade as a block to detect effects among tenth graders. Among tenth graders, the prevalence of current smoking is much higher, approximately 26% (U.S. Department of Health and Human Services 1999), so ceiling effects were much less likely.

Results. Table 2 shows the omnibus F-statistics and cell means; t-tests follow. Among all subjects, four message themes enhanced health risk severity perceptions: Disease and Death ($t = 2.79, p < .05$), Endangers Others ($t = 3.33, p < .01$), Selling Disease and Death ($t = 4.11, p < .01$), and Substantive Variation ($t = 3.40, p < .01$). Three message themes enhanced the perceived severity of the social disapproval risks of smoking: Endangers Others ($t = 2.71, p < .06$), Smokers' Negative Life Circumstances ($t = 2.82, p < .05$), and Refusal Skills Role Model ($t = 2.73, p < .05$). Intentions not to smoke were bolstered by the same three message themes: Endangers Others ($t = 3.96, p < .01$), Smokers' Negative Life Circumstances ($t = 3.51, p < .01$), and Refusal Skills Role Model ($t = 2.81, p < .05$). However, the effects on social risk severity perceptions and intentions were confined to tenth graders, so the preceding t-tests pertain to this group. Seventh graders' social risk perceptions and intentions were unaffected. (For social risk severity: message effect $F(8, 1649) = 1.34, p = .22$; message by grade $F(8, 1649) = 2.33, p < .05$. For intentions: message effect $F(8, 1643) = 2.23, p < .05$, but among seventh graders, there were no effects for antismoking versus control messages; message by grade $F(8, 1643) = 3.08, p < .01$.)

None of the message themes affected self-efficacy at refusing cigarette offers, self-efficacy at resisting tobacco marketing, health risk vulnerability, the benefits of smoking, or the costs of not smoking ($p > .10$), but null results were expected in the last three cases because the message themes did not address these topics. Finally, the Marketing Tactics message theme unexpectedly bolstered tenth graders' perceived vulnerability to social disapproval risks ($t = 3.37, p < .01$). This theme apparently implied that if marketers make such a concerted effort to influence societal opinions, those opinions must be important. To reiterate, the Disease and Death, Selling Disease and Death, Marketing Tactics, Cosmetics, and Substantive Variation message themes did not significantly affect intentions. None of the antismoking

(versus control) message themes had any effects beyond those reported previously ($p > .10$).^{3,4}

LISREL Results on How Cognitions Affected Intentions

Analysis plan. We predicted that the eight measured protection motivation theory cognitions should directly, and possibly also interactively, influence intentions. To test these interrelationships, we pooled the data from all experimental conditions.⁵ We then used LISREL analyses, because all focal variables were measured and LISREL models errors in measurement and estimates path coefficients with less bias than analysis of variance or regression (Jöreskog and Sörbom 1993). We used 24 indicators to measure our nine latent constructs (eight cognitions plus intentions), with 2 to 4 indicators per construct. If a construct was measured by several items, the items were randomly divided into 2 or 3 indicator variables to enhance parsimony and facilitate model estimation (Jöreskog and Sörbom 1996a). We restricted all indicators to load onto their respective latent constructs. We allowed the eight latent cognitive variables to covary freely. We assumed error terms to be independent. Because the data were ordinal and skewed, we used weighted least square estimation (Jöreskog and Sörbom 1996a). We used PRELIS 2 to generate input matrices and LISREL 8 to estimate the models (Jöreskog and Sörbom 1996a, b).

To test for two-way interactions among cognitions, we applied multiple-group structural equation modeling (Bollen 1989; Jöreskog and Sörbom 1993). For each variable that theoretically could be involved in an interaction (severity, vulnerability, and efficacy; Rogers 1975), we divided subjects into two levels on the basis of whether they scored above the variable's mean. Then, for each theorized two-way interaction, we estimated two models of effects on intentions. In the constrained model, we restricted the effect of the first variable in the two-way interaction to be equal

³Additional analyses revealed that message, past smoking behavior, and grade interactively influenced intentions ($F(8, 1581) = 2.72, p < .01$). The Endangers Others, Smokers' Negative Life Circumstances, and Refusal Skills Role Model (versus control) message themes boosted intentions not to smoke among tenth graders who had tried smoking ($t = 2.79, 3.40, \text{ and } 2.74; p < .05$). The absence of effects among tenth graders who had never smoked seems to be attributable to ceiling effects on intentions (mean = 4.52, maximum = 5); likewise for seventh graders who had never smoked (mean = 4.42). Too few seventh graders had tried smoking to permit meaningful tests of our hypotheses.

⁴We also assessed subjects' knowledge of the sources, tactics, effects, and ethics of pro-tobacco messages, which are the key dimensions of persuasion knowledge (Friestad and Wright 1994). The Marketing Tactics, Selling Disease and Death, and Substantive Variation (versus control) message themes enhanced subjects' persuasion knowledge ($p < .05$), but this knowledge failed to bolster subjects' feelings of self-efficacy at being able to resist tobacco marketing.

⁵The data were also analyzed separately within each message condition, but the pattern of findings was unchanged. In other words, the antismoking message theme affected the mean levels of cognitions and intentions, but not the relationships between cognitions and intentions. These findings are consistent with protection motivation theory, which assumes that the cognition-intention relationships are relatively stable and predictable.

TABLE 2
Effects of Antismoking Message Themes on Adolescents: Mean Postexposure Responses

Dependent Measure	Message Effect: F (d.f.)	Antismoking Message Theme								Substantive Variation (All Messages)	Messages Unrelated to Smoking (Control)
		Disease and Death	Endangers Others	Cosmetics	Smokers' Negative Life Circumstances	Refusal Skills Role Model	Marketing Tactics	Selling Disease and Death			
Severity of health risks	3.84*** (8, 1649)	7.68**	7.91***	7.46	7.10	7.54	7.14	8.15***	7.90***	6.68	
Vulnerability to health risks	1.16 (8, 1631)	4.43	4.42	4.40	4.55	4.35	4.32	4.39	4.42	4.34	
Severity of social disapproval risks	2.10** (8, 870)	3.98	4.09*	3.98	4.09**	4.10**	3.89	3.96	3.82	3.77	
Vulnerability to social disapproval risks	2.90*** (8, 870)	2.30	1.96	2.02	2.48	2.17	2.76***	2.29	2.22	2.10	
Self-efficacy at refusing cigarette offers	.39 (8, 1639)	4.25	4.25	4.32	4.35	4.33	4.29	4.31	4.27	4.23	
Self-efficacy at resisting tobacco marketing	1.68 (8, 1640)	4.16	4.25	4.35	4.04	4.38	4.12	4.31	4.29	4.22	
Benefits of smoking	1.20 (8, 1632)	2.06	1.83	1.88	2.01	1.82	1.97	1.98	1.99	2.04	
Costs of not smoking	1.23 (8, 1589)	2.37	2.36	2.28	2.22	2.48	2.50	2.32	2.39	2.50	
Intentions not to smoke	3.56*** (8, 866)	3.95	4.22***	3.87	4.13***	4.03**	3.68	3.88	3.64	3.53	

Notes: Higher numbers indicate higher scores on the indicated variables. All scales are 1–5 except severity of health risks (0–9). F-statistics and means for social disapproval risks and intentions not to smoke are based on the tenth grade sample, because message theme effects were confined to these subjects. Asterisks indicate either an omnibus message theme effect or an anti-smoking message theme (versus control group) effect: * $p < .06$, ** $p < .05$, *** $p < .01$.

across both levels of the second variable. In the unconstrained model, we allowed the effect of this first variable to vary freely. If the unconstrained (versus constrained) model produced a significant χ^2 reduction ($p < .05$), we concluded that there was an interaction effect.⁶

Measurement properties. We first examined the psychometric properties of our measurement model by conducting a confirmatory factor analysis using LISREL 8, and the results were favorable. The reliability estimates for the indicators ranged from .87 to .99. Furthermore, the indicators had large and significant ($p < .001$) factor loadings on their respective latent constructs, and the variance extracted by each latent construct was greater than the recommended level of .50 (Fornell and Larcker 1981). The discriminant validity results were also favorable. Using a series of nested confirmatory factor analysis models, we found that whenever the correlation between two latent constructs was restricted to one rather than being allowed to vary, the fit of the model worsened, as indicated by a significant increase in χ^2 . In addition, the variance extracted by each latent construct was substantially larger than its shared variance with other latent constructs (Fornell and Larcker 1981). For details, see Table 3.

Main effects. The main effects structural model predicting a direct relationship between each cognition and intentions fits the data well. The model χ^2 is 539.79 (216 degrees of freedom [d.f.], $p < .01$). The χ^2 divided by the degrees of freedom (2.50), root mean square error of approximation (.031), goodness-of-fit index (.998), adjusted goodness-of-fit index (.997), normed fit index (.997), nonnormed fit index (.998), and comparative fit index (.998) all indicate an adequate fit of the model. The following cognitions, listed from most to least influential, enhanced intentions not to smoke: severity of social disapproval risks, self-efficacy at refusing cigarette offers, vulnerability to social disapproval risks, and vulnerability to health risks (which is qualified by an interaction; see the subsequent discussion). Also, the perceived benefits of smoking lowered nonsmoking intentions. Severity of health risks, self-efficacy at resisting tobacco marketing, and costs of not smoking were not associated with intentions. For coefficients and t-values, see Table 4.

Interaction effects. We examined all theoretically possible two-way interactions among severity, vulnerability, and efficacy (Rogers 1975). There were ten such interactions (see Table 5). All theorized three-way interactions were also tested, but no meaningful patterns emerged, so these analyses are not discussed further. Two two-way interactions were significant (see Figure 1). Health risk severity and health risk vulnerability interactively influenced intentions. Among subjects who were at or below the mean on health risk vulnerability ($n = 511$), higher perceived health risk severity was associated with weaker nonsmoking intentions. Among subjects who were above the mean ($n = 1069$, a larger group due to a skewed distribution), health risk severity perceptions and intentions were unassociated. It appears that these subjects felt only moderately vulnerable because, had they

felt highly vulnerable, there would have been a positive association between severity and intentions (Block and Keller 1998; Kleinot and Rogers 1982).⁷ Health risk vulnerability and self-efficacy at refusing cigarette offers also functioned synergistically. Higher perceived health risk vulnerability was associated with stronger nonsmoking intentions among subjects who were above the mean on self-efficacy at refusing offers ($n = 1097$), whereas health risk vulnerability and intentions were unassociated among subjects who were at or below the mean ($n = 483$).

Final Discussion

Summary of Main Results

Of the seven antismoking message themes we tested, only three (Endangers Others, Refusal Skills Role Model, and Smokers' Negative Life Circumstances) bolstered adolescents' intentions not to smoke, and all did so by conveying that smoking cigarettes poses severe social disapproval risks (see Figure 2). Cosmetics messages sought to influence social risk severity perceptions but failed, apparently because the problems stressed (e.g., bad breath) could be minimized by using cosmetic products. Refusal Skills Role Model messages had a secondary aim: to boost adolescents' perceived self-efficacy at refusing cigarette offers. However, such perceptions seemed to be relatively unmalleable, as they were unaltered by ad exposure, though they were predictive of behavioral intentions. To boost self-efficacy perceptions, it may be necessary to implement media literacy programs that enable practice and mastery of focal skills.

Two message themes (Disease and Death and Selling Disease and Death) increased health, rather than social, risk severity perceptions. However, it seems that few adolescents felt vulnerable to the health risks, which undercut the efficacy of health severity messages. Among youths who felt immune to health risks, higher perceived health risk severity was associated with stronger intentions to smoke. In other words, in the context of low perceived vulnerability, stressing health risks could increase smoking's symbolic value as a risk-seeking, rebellious, and thus attractive behavior. Two message themes (Marketing Tactics and Selling Disease and Death) discussed tobacco marketing tactics. However, these message themes failed to influence adolescents' perceived self-efficacy at resisting tobacco marketing tactics, and in any event, such perceptions were not predictive of behavioral intentions. Finally, we tested a heterogeneous, or Substantive Variation, message condition, with essentially one advertisement per message theme. This message condition boosted health risk severity perceptions, but not social risk severity or self-efficacy perceptions, and had no effect on intentions. We speculate as to why in the next section.

Substantive Contributions and Implications

On the basis of our findings, when policy officials and advertising agencies design antismoking campaigns for adolescents, they should seriously consider using norm-based

⁶In these model pairs, cost effects were constrained to be equal, as were benefit effects, because neither variable has been theorized to be involved in any interaction. The remaining four cognitive variables were allowed to vary freely.

⁷We split the sample into three vulnerability groups in an attempt to find high-vulnerability subjects. However, the pattern of results was unchanged, which indicates that few subjects felt highly vulnerable to smoking's health risks.

TABLE 3
LISREL Model Latent Constructs: Summary Information

Dependent Measures	Correlations									Variance Extracted	Factor Loadings
	1	2	3	4	5	6	7	8	9		
1. Intentions not to smoke	.94	.01	.06	.34	.00	.10	.02	.22	.01	.85	.907, .928, .925
2. Severity of health risks	.09	.99	.03	.02	.01	.01	.03	.02	.00	.96	.960, .998, .980
3. Vulnerability to health risks	.25	.16	.96	.07	.01	.08	.04	.06	.04	.89	.964, .924, .935
4. Severity of social disapproval risks	.58	.13	.27	.89	.00	.09	.03	.45	.01	.79	.915, .867
5. Vulnerability to social disapproval risks	.01	-.09	-.08	-.02	.96	.00	.04	.00	.00	.85	.940, .964, .858, .916
6. Self-efficacy at refusing cigarette offers	.32	.10	.29	.30	-.06	.87	.14	.07	.01	.70	.856, .908, .739
7. Self-efficacy at resisting tobacco marketing	.14	.17	.20	.16	-.19	.38	.95	.03	.00	.91	.931, .980
8. Benefits of smoking	-.47	-.15	-.25	-.67	.06	-.27	-.17	.93	.01	.87	.904, .959
9. Costs of not smoking	-.10	-.05	-.21	-.09	.05	-.08	-.03	.08	.93	.87	.881, .983

Notes: For columns 1–9, the numbers below the diagonal are correlations, the numbers above the diagonal are shared variances, and the boldface numbers on the diagonal are construct reliabilities. Factor loadings are standardized; all $p < .001$. Factor loadings for the specific scale items can be obtained from the first author.

appeals—specifically, appeals that convey that smoking poses severe social disapproval risks (see also Pechmann and Shih 1999). This strategy would be consistent with considerable prior research that suggests a strong link between adolescents' perceptions of smoking norms and their intentions and behaviors (Chassin et al. 1984; Collins et al. 1987; Conrad, Flay, and Hill 1991; Pechmann and Knight 2002; Pechmann and Ratneshwar 1994). Our latest research indicates that norm-based appeals are declining in prevalence, which would appear to be an undesirable trend. Although

many of the recent Philip Morris antismoking advertisements seem to contain social norm messages, they do not appear to be effective (Farrelly et al. 2002), perhaps because their messages are mixed. In our view, many of the Philip Morris advertisements seem to imply that both nonsmoking and smoking are socially acceptable behaviors, which does not constitute a clear antismoking message. Furthermore, the Philip Morris advertisements tend to show nonsmokers who are clean-cut and stereotypically “good” and might imply that adolescents should smoke if they want to demon-

TABLE 4
LISREL Results for Main Effects Model

Variables Posited to Affect Intentions Not to Smoke, Based on Protection Motivation Theory (Expected Signs)	Standardized Coefficient	t-Value
Severity of health risks (+)	-.028	-1.13
Vulnerability to health risks (+)	.062	2.23*
Severity of social disapproval risks (+)	.502	11.42**
Vulnerability to social disapproval risks (+)	.079	3.29**
Self-efficacy at refusing cigarette offers (+)	.213	6.09**
Self-efficacy at resisting tobacco marketing (+)	.007	.21
Benefits of smoking (-)	-.093	-2.04*
Costs of not smoking (-)	-.019	-.83

* $p < .05$.

** $p < .01$.

TABLE 5
LISREL Results for Interaction Effects Models

Possible Interaction Effects Posited by Protection Motivation Theory	χ^2	d.f.	χ^2 Difference	d.f.
Health risk severity \times health risk vulnerability				
Unconstrained (interaction) model	689.58	337		
Constrained model	699.51	338	9.93**	1
Health risk severity \times self-efficacy at refusing offers				
Unconstrained (interaction) model	689.29	337		
Constrained model	689.62	338	.33	1
Health risk vulnerability \times self-efficacy at refusing offers				
Unconstrained (interaction) model	689.29	337		
Constrained model	694.70	338	5.41*	1
Health risk severity \times self-efficacy at resisting marketing				
Unconstrained (interaction) model	800.07	379		
Constrained model	800.33	380	.26	1
Health risk vulnerability \times self-efficacy at resisting marketing				
Unconstrained (interaction) model	800.07	379		
Constrained model	800.39	380	.32	1
Social risk severity \times social risk vulnerability				
Unconstrained (interaction) model	475.71	298		
Constrained model	478.80	299	3.09	1
Social risk severity \times self-efficacy at refusing offers				
Unconstrained (interaction) model	689.29	337		
Constrained model	691.82	338	2.53	1
Social risk vulnerability \times self-efficacy at refusing offers				
Unconstrained (interaction) model	689.29	337		
Constrained model	689.51	338	.22	1
Social risk severity \times self-efficacy at resisting marketing				
Unconstrained (interaction) model	800.07	379		
Constrained model	800.16	380	.09	1
Social risk vulnerability \times self-efficacy at resisting marketing				
Unconstrained (interaction) model	800.07	379		
Constrained model	800.08	380	.01	1

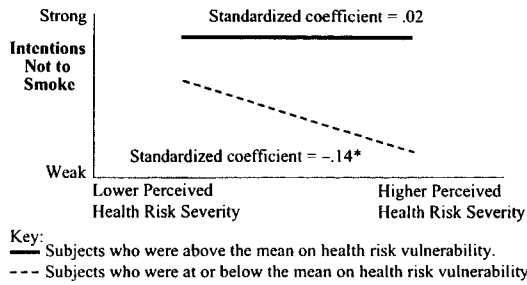
* $p < .05$.

** $p < .01$.

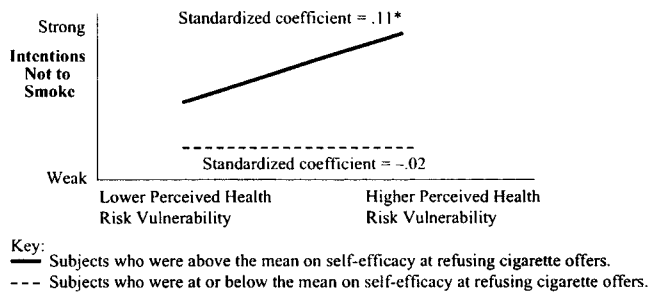
Notes: A smaller χ^2 indicates a better fit between the observed and estimated covariation matrices.

FIGURE 1
Illustrations of Interactions Detected in LISREL

A: Health Risk Severity × Health Risk Vulnerability

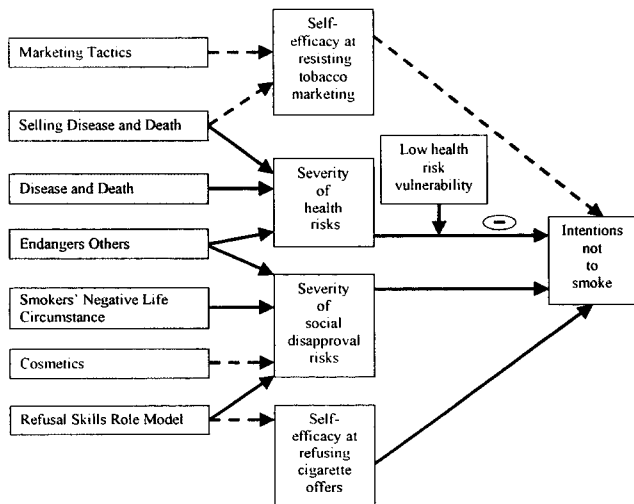


B: Health Risk Vulnerability × Self-Efficacy at Refusing Offers



* $p < .01$.

FIGURE 2
Summary of Key Findings



Notes: Solid lines show significant effects; dotted lines show hypothesized but nonsignificant effects. All relationships are positive, except the negative effect of perceived severity of health risks on intentions given low perceived health risk vulnerability. For parsimony, the Substantive Variation message condition is not included in this figure. It was hypothesized to enhance all of the cognitive variables and intentions not to smoke, but it only enhanced the perceived severity of health risks.

strate that they are not “goody two shoes” (Amos et al. 1998).

When youths are targeted, stressing the severity of long-term health risks does not appear to be an effective strategy; indeed, doing so could enhance smoking’s forbidden fruit allure. However, our recent findings indicate that advertisements that stress health risk vulnerability, not severity, seem to work. Therefore, if policy officials want to use health-based appeals, we recommend that the appeals convey that adolescents are highly vulnerable to smoking’s health risks. The advertisements might, for example, tell true-life stories of younger victims, stress how quickly these victims became addicted to smoking, and show how much they have suffered (Biener 2000; Teenage Research Unlimited 1999). When health risk vulnerability advertisements are developed, it may be useful to keep in mind the vulnerability × efficacy interaction that we observed. This interaction suggests that advertisements about health risk vulnerability bolster nonsmoking intentions among youths who feel capable of refusing cigarette offers, but not among youths who feel incapable of refusing (Rogers 1975, 1983). On the basis of this finding, it may be beneficial to supplement vulnerability-focused advertisements with school programs that teach refusal skills (CDC 1994; Glynn 1989).

Our findings to date suggest that tobacco marketing (anti-industry) advertisements may not be especially effective with adolescents, though such advertisements are popular, in part because of the apparent success of the Florida Truth campaign (Bauer et al. 2000; Farrelly et al. 2002). The advertisements we studied did not alter adolescents’ behavioral intentions. It is possible that advertisements of this type may work if they elicit stronger reactance or rebellion against tobacco firms. According to reactance theory (Brehm 1972), it should be possible to intensify reactance by, for example, showing tobacco firms using heavy-handed tactics to persuade youths to smoke or stressing the number and importance of the threatened freedoms (Clee and Wicklund 1980). Alternatively, what may be needed are advertisements that address youths’ primary misconception about why they smoke. Most youths naively believe they smoke not because of tobacco marketing but because their friends look cool doing it (Pechmann and Knight 2002). According to Pechmann and Knight’s (2002) research, youths perceive that smokers “look cool” in large part because the attractive, cool models in cigarette advertisements prime or make salient positive smoker stereotypes and bias social perceptions (see also Romer and Jamieson 2001). Therefore, tobacco marketing advertisements may be needed that educate youth about this priming phenomenon. We recommend further research on these issues.

In the current research, the Substantive Variation (heterogeneous) message condition did not perform as well as expected, having no impact on intentions. However, this may be due to the way we set up the Substantive Variation condition. We used only one advertisement (at most two) to convey each theme, so the total number of advertisements was eight, the same as in the other message conditions. Furthermore, we selected the advertisements in the Substantive Variation condition at random from those used in the other conditions. We did this to equate the message conditions as much as possible and thus minimize confounds. As it turns

out, though, the advertisements that were used to convey social risk severity in the Substantive Variation condition may have been too few in number or too weak to do much good. Because the advertisements did not affect this critical social cognition, the Substantive Variation condition as a whole had no impact on intentions. On the basis of these findings, we do not recommend that sponsors of antismoking advertising campaigns use all seven of the message themes studied here concurrently, particularly if they are on a limited budget. However, they may want to use the three most effective themes identified here (Endangers Others, Refusal Skills Role Model, and Smokers' Negative Life Circumstances) if they have an adequate budget. Substantively varied advertising campaigns have been shown to forestall tedium and wearout, particularly when the advertising topic is highly relevant to viewers (Schumann, Petty, and Clemons 1990), as the antismoking issue may well be.

Because it is a challenge to create good advertising, quantitative copy testing should be conducted to ensure that any advertisement that is included in a campaign actually bolsters antismoking beliefs and intentions (Pechmann and Reibling 2000). Furthermore, we recommend copy testing advertisements among ninth or tenth graders, not among middle school students. Our findings indicate that middle school youths' survey responses may be so strongly antismoking that no ad effects can be discerned because of ceiling effects. Finally, we do not recommend that advertisements be evaluated on the basis of viewers' ratings of perceived ad effectiveness (Biener 2000; Teenage Research Unlimited 1999). In our research, all sets of advertisements were virtually equivalent on perceived ad effectiveness, yet they were found to differ in their effects on both beliefs and intentions.

Theoretical Contributions

This research supports recent efforts by Ho (1998) to extend protection motivation theory formally to include social risks. We find that social risk severity and vulnerability are distinguishable from their health risk counterparts and that social risk severity perceptions are especially predictive of adolescents' behavioral intentions. Our results further indicate that Rogers's (1983) decision to drop the health risk severity \times vulnerability interaction from protection motivation theory and to focus on threat \times coping appraisal interactions may have been ill advised; his original formulation seems preferable.

We also contribute to the literature on decision making and risk, in which severity \times vulnerability interactions have been theorized but rarely observed in health contexts (Weinstein 1993, 2000). Weinstein (2000) argues that important interactions between health risk severity and vulnerability have not been documented because prior studies have examined mid-level variable values, and interactive effects occur

at more extreme levels. Here, we document an interaction that has rarely been observed. Given low perceived vulnerability, higher perceived health risk severity was associated with increased intentions to engage in a risky behavior. Given moderate vulnerability, severity and intentions were unassociated. If found to be prevalent, this interaction would appear to have important implications. Most theories posit that health risk severity messages will discourage risky behaviors (Rogers 1975, 1983; Weinstein 1993), yet they could have the opposite effect among people who view themselves as invincible.

Research Limitations

We studied antismoking advertising's impact on intentions, not behavior, because a field experiment of seven message themes would have been too costly. Also, to differentiate our study from prior work on multifaceted tobacco control efforts, we focused strictly on advertising. It is conceivable that advertising that is ineffective on its own becomes effective when combined with other efforts. We used a forced-exposure copy test method; therefore, if a certain message theme was more attention getting than others, this effect would have been masked. We did not embed the advertisements in television programming, because a cluttered copy test environment "adds complexity and is possibly confounding" (Aaker, Batra, and Myers 1992, p. 425). Because subjects were told that the study was about advertisements, they could conceivably have sought to provide socially desirable, proadvertisement responses (Aaker, Batra, and Myers 1992). If this bias was operative, though, all of the message themes should have been effective, and many were found to be ineffective. Nevertheless, it would be beneficial to conduct a follow-up study that uses a more naturalistic exposure environment.

There was a weak correspondence between message theme and execution. To examine this issue post hoc, three trained research assistants coded the stimulus advertisements on several executional variables, including spokesperson age, emotional tone and intensity, and sensation value (Schoenbachler and Whittler 1996). The findings indicate that these variables alone cannot explain the results. For example, compared with other message themes, the Refusal Skills Role Model and Cosmetics message themes used somewhat more youthful spokespeople, yet only the former bolstered nonsmoking intentions. Also, both the Selling Disease and Death and Endangers Others message themes scored relatively highly on emotional intensity, but only the latter influenced intentions. However, researchers may want to address the possible moderating effects of these and other executional variables. The funding that is available for antismoking advertising is unprecedented, and sound marketing research should play a major role in helping ensure that the money is wisely spent.

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