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How Graphic Visual Health Warnings Affect Young Smokers' Thoughts of Quitting

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Two-thirds of adolescent and young adult smokers become lifetime smokers, and one-half of those lifetime smokers will die from this habit. The authors examine alternative persuasive pathways to thoughts of quitting taken by adolescent and young adult smokers when exposed to graphic visual health warnings on cigarette packages. For adolescent smokers, the authors find that graphic warnings and smoking frequency affect fear, and fear influences negative health beliefs about smoking, ultimately increasing thoughts of quitting. They also find that the graphic warning and a graphic warning × smoking frequency interaction have *incremental effects* on quit thoughts beyond the effects of fear and negative health beliefs. Using a longitudinal design with a sample of young adult smokers, the authors find support for many of the adolescent smoker findings, particularly the incremental effects of graphicness and its interaction with smoking frequency. These similar results from diverse samples support the use of graphic visual warnings but suggest that effects are attenuated for those who smoke the most. The authors offer implications for countermarketing programs and public health policy.

Keywords: adolescent smoking, health warnings, graphicness, fear, quit thoughts

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The development of effective countermarketing efforts to reduce adolescent smoking represents one of the most important public health efforts today (Centers for Disease Control and Prevention [CDC] 2013b; Wakefield, Loken, and Hornik 2010). The focus on adolescent smoking is important, as approximately 4,000 adolescents try their first cigarette every day in the United States, and an estimated 1,000 of these youth become daily cigarette smokers (Substance Abuse and Mental Health Services Administration 2011). For every three young smokers, only one will quit, and half of those who continue to smoke will die from tobacco-related causes. As such, smoking has been described as a *pediatric* disease because more than 88% of current adult smokers began their habit before 18 years of age (Kessler et al. 1997; Surgeon General Report 2012). When smokers become addicted, it is difficult to stop; 69% of current smokers who want to quit are unable to do so (CDC 2013b). The CDC (2013a) estimates that smoking results in approximately 443,000 deaths each year in the United States and more than 5 million worldwide.

Over the years, many countermarketing and educational measures have been implemented in an attempt to move adolescent and young adult smokers along the path to cessation (CDC 2013b). These attempts include antitobacco ad campaigns (Andrews et al. 2004; Farrelly et al. 2005; McAfee et al. 2013; Pechmann and Reibling 2000; Pech-

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mann et al. 2003), comprehensive school-based programs (Flynn et al. 1994), restriction of promotion at retail stores (Slater et al. 2007), and increased excise taxes to limit usage for more advanced adolescent smokers (Emery, White, and Pierce 2001). Although many of these efforts have shown some success in reducing smoking intentions and/or behavior, the most prominent countermarketing tool that has been employed in more than 43 countries worldwide today (though not in the United States) is the use of graphic visual health warnings on cigarette packages (Myers 2012). In the United States, the Family Smoking Prevention and Tobacco Control Act (2009) mandated the addition of colored, graphic visual warnings to accompany new warning statements (*Federal Register* 2011). However, drawing on First Amendment commercial speech rights, the U.S. Courts upheld tobacco industry challenges to the specific graphic warnings the Food and Drug Administration (FDA) selected, noting that there was little evidence presented that the warnings would affect smoking rates. The inclusion of graphic pictorial warnings is a controversial issue in the United States, and the FDA is working to develop and test new pictorial warnings that are likely to pass the questions raised by the U.S. Courts (Myers 2012).

Although some research exists on understanding how *adult* smokers process graphic visual health warnings (e.g., Hammond et al. 2003; Kees et al. 2006, 2010; McAfee et al. 2013; Romer et al. 2013), it is uncertain exactly how *adolescent* smokers will react to such warnings, especially those evaluated as "highly graphic." Will they express stronger thoughts of quitting after exposure to graphic pictures? After all, adolescence is a period of risk taking, experimentation, sensation seeking, and impulsivity—at times leading to addiction (Block et al. 2002; Ozanne and Anderson 2006). Furthermore, will their thoughts of quitting be driven by smoking health beliefs (e.g., "what they know") and/or evoked fear (cf. Shiv and Fedorkhin 1999)? Finally, as "novice" smokers, will their smoking frequency influence thoughts of quitting and moderate the impact of the graphic visual health warnings (Mayhew, Flay, and Mott 2000; Prochaska and DiClemente 1983)?

Therefore, our first study addresses the following questions for adolescent smokers: (1) Will the graphic level of the visual health warnings on cigarette packages and smoking frequency affect evoked fear and negative health beliefs about smoking? (2) Will evoked fear and negative health beliefs influence thoughts of quitting smoking? (3) Will the graphicness of the warnings affect thoughts of quitting beyond the potential mediating effects of evoked fear and negative health beliefs? and (4) Will smoking frequency moderate this effect?

As an extension of our first study, prior research has indicated strongly that smoking patterns and nicotine addiction become entrenched for smokers in their late teens to late twenties (Chassin et al. 2001; Costello et al. 2008; see also Tormala and Petty 2004). Because those who are not committed smokers by their late twenties are unlikely ever to become regular smokers, this demographic group also is an important target for countermarketing appeals. Thus, using a longitudinal design, our second study addresses the aforementioned questions for *young adult* smokers to determine whether the findings for adolescent smokers hold for young adult smokers.

CONCEPTUALIZATION, MODEL OVERVIEW, AND HYPOTHESES

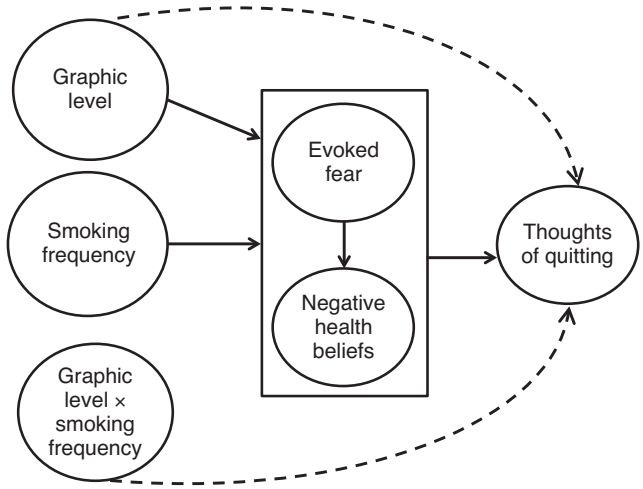
Background on Warnings

When appropriately designed, warnings can be important communication devices to help persuade and motivate changes in behavior (Andrews 2011; Bettman, Payne, and Staelin 1986). For smokers, warnings on cigarette packages can result in high frequency of exposure at the point of sale and just before repeated use, potentially affecting smoking-related health beliefs and behavior (Hammond et al. 2003). A text-based warning on cigarette packaging has been in place in the United States since 1966, predating the inclusion of warnings in all other countries. However, U.S.-based warning labels have frequently been criticized as among the "smallest and least prominent" warnings in the world (Dumas 1990). To address this weakness, and as noted previously, the U.S. Family Smoking Prevention and Tobacco Control Act (2009) mandated the addition of colored, graphic visual warnings to accompany new warning statements (*Federal Register* 2011). Considering the widespread criticism of the existing U.S. text-based warnings, the use of the colored, graphic visual health warnings would represent the most significant change to U.S. cigarette packaging in almost 30 years, and one which is already in place in more than 43 countries around the world.

Conceptualization and Model Overview

We address several variables associated with the graphic visual health warnings (see Figure 1). First, *graphicness* ("graphic level") refers to the extent to which people perceive the visual health warning as vivid, powerful, and

Figure 1
HYPOTHESIZED EFFECTS ON YOUNG SMOKERS' THOUGHTS OF QUITTING



Notes: The paths depicted in this figure are hypothesized paths. Specifically, the solid-line paths from graphic level and smoking frequency to evoked fear and negative health beliefs as well as the solid-line paths among evoked fear, negative health beliefs, and thoughts of quitting represent the "initial model." The dotted-line paths from graphic level and the interaction path of graphic level × smoking frequency to thoughts of quitting represent the "incremental effects" model. For clarity purposes, control variable paths are not shown.

intense (Kees et al. 2010). As Witte and Allen (2000) note, highly vivid and shocking pictures are often used to evoke fear, with higher levels of fear associated with greater persuasion. Such graphicness is often necessary in overcoming entrenched and opposite initial views by smokers regarding quitting (cf. Petty and Cacioppo 1986). *Smoking frequency* reflects the number of days smoked in the past month. As a measure of negative affect, *evoked fear* is a key emotional outcome of warning communication (Andrews 2011; Witte and Allen 2000) and measures the extent to which the communication has made the receiver fearful, anxious, nervous, and/or afraid. *Negative health beliefs* refer to the association of specific negative health consequences with performing the targeted behavior (e.g., smoking causes lung cancer, smoking is addictive, secondhand smoke dangers) (Tramifow and Sheeran 1998). As a measure of intention, we assess *thoughts of quitting* in adolescents and young adults (see also Romer et al. 2013).

As Figure 1 shows, we predict that the level of graphicness and smoking frequency will influence evoked fear and negative health beliefs about smoking. Then, we expect both evoked fear and negative health beliefs to influence thoughts of quitting. We also predict direct, *incremental* effects for graphicness and its interaction term with smoking frequency on thoughts of quitting. That is, we propose that both the graphicness and the graphicness × smoking frequency interaction will influence thoughts of quitting beyond the effects of negative health beliefs and evoked fear. This moderating role of smoking frequency on the impact of the graphic level on thoughts of quitting is of particular interest in gaining a better understanding of how different segments of adolescent smokers may process and react to these visual health warnings.

Hypotheses

Graphicness → evoked fear. Evidence shows the positive impact of visual (vs. verbal or text-based) stimuli on memory and attitudes (cf. Kisielius and Sternthal 1984). Such effects are particularly apparent within the context of health warnings pertaining to tobacco use. For example, Kees et al. (2006) find that the addition of a graphic visual to a text-based cigarette warning decreases the perceived attractiveness of the cigarette package. In addition, in a study of current text-based U.S. warnings versus current Canadian warnings (with combined text and graphic visuals), Peters et al. (2007) show that the Canadian labels produce a greater negative response for U.S. adult smokers without any signs of defensive or reactive responses.

However, in moving beyond the simple presence of graphic visual warnings, it is important to study the *graphic level of the warning* to more fully understand the role of evoked fear and the underlying effects from the graphic visual exposure. Traditional research on vividness in persuasive communications suggests that highly graphic message presentation can increase persuasiveness. For example, research on fear has linked characteristics of stimuli such as highly vivid and shocking pictures to the level of evoked fear (Witte and Allen 2000). Vivid or graphic depictions of a behavior's dire consequences are often used to evoke fear to increase behavioral compliance with the persuasive message (Morales, Wu, and Fitzsimons 2012; Witte 1992). Although some meta-analyses have found that high-involvement people react favorably to moderate levels of fear (Keller and Lehmann 2008), other research has indicated that highly motivated people may require only low levels of fear, whereas the uninvolved may require high levels (Keller and Block 1996). Overall, however, independent meta-analyses have concluded that, in general, higher levels of fear lead to greater persuasion (Boster and Mongeau 1984; Witte and Allen 2000).

Research based on the Transtheoretical (Stages of Change) Model has suggested that an important process of change for smokers can be an increased emotional experience and response (e.g., fear) (Prochaska and Velicer 1997). For example, Kees et al. (2010) find that the more graphic the visual warning, the greater the evoked fear for adult smokers. Whether this relationship will hold for adolescent smokers remains an open question; yet research with adolescents and young adults in other domains using graphic messages or images indicates that such an effect is tenable. For example, Witte and Morrison (1995) suggest that the "scarier" the image in AIDS prevention communications, the higher the level of evoked fear in adolescents, and Morales, Wu, and Fitzsimons (2012) show that higher levels of fear (from graphic images) are associated with greater levels of persuasion and compliance in reducing intentions to use illicit drugs. Thus, we hypothesize the following:

> H_1: The perceived graphicness of the warning label is positively related to evoked fear.

Smoking frequency → evoked fear. Many smoking prevention programs attempt to limit adolescent experimentation with smoking and subsequent movement to possible smoking addiction. The stage model of smoking acquisition suggests that regular smokers progress through five distinct behavioral stages, beginning with preparation (never smoked) and ending with maintenance (addicted smoker) (Leventhal and Cleary 1980). Although early-stage smokers may be aware of some of the general risks of smoking (Arnett 2000; Brown, Carpenter, and Sutfin 2011), they tend to focus more on its positive aspects (Mayhew, Flay, and Mott 2000). Therefore, many argue that it is important for antismoking messages to strongly communicate the negative aspects of smoking in these early stages. Thus, usage frequency has been shown to be a key variable in examining how adolescents' exposure to antismoking media ads affects their progression to established smoking and other smoking perceptions (Siegel and Biener 2000).

Research has suggested that the level of prior drug usage (i.e., frequency of drug use) influences the probability of future drug use and may diminish the effectiveness of antidrug advertising that may evoke fear for adolescents (Block et al. 2002). Prior trial tobacco use by adolescents has also been shown to lower negative emotional reactions (fear) to antitobacco ads (Pechmann and Reibling 2006). This and other evidence lends support to a negative frequency of smoking → evoked fear path. For example, adolescent smokers are relatively more "novice" in their smoking history and are more likely to be occasional smokers compared with their adult counterparts (cf. Arnett 2000; Brown, Carpenter, and Sutfin 2011; Turner, Veldhuis, and Mermelstein 2005). Yet as the frequency of the behavior increases, the evoked fear of a persuasion attempt tends to be discounted, resulting in a negative relationship between

frequency and evoked fear (McGuire 1980). This notion is also consistent with a "defensive processing" approach that youths may use to undermine a fear-based persuasion attempt toward a negative behavior (McGuire 1980). As such, lower-frequency smokers with more restricted smoking experience should be more sensitive to graphic visual stimuli that are more likely to evoke fear. In contrast, higher-frequency smokers are more likely to respond defensively and discount the visual images that would lead to higher levels of fear.

H_2: Frequency of smoking is negatively related to evoked fear.

Graphicness → negative health beliefs about smoking. Warnings can communicate key risks effectively, but only if they are appropriately designed for the right target audience, accounting for message content, message modality, initial beliefs, and source and receiver effects (cf. Andrews 2011). As applied to adolescents, this may require separate stimuli and testing (Andrews et al. 2004; Pechmann and Reibling 2000; Pechmann et al. 2003). Adolescents are a particularly vulnerable segment because they often hold misperceptions about the health risks and addictive nature of cigarettes (Arnett 2000; Jamieson and Romer 2001; Kropp and Halpern-Felsher 2004).

Behavioral intention models suggest that antismoking interventions can influence health beliefs about smoking, which in turn affect smoking behavior (Higgins and Bargh 1987). In contrast to adult smokers, adolescent smokers may have less crystallized beliefs and perceptions regarding certain health effects of smoking (e.g., addiction, effects of secondhand smoke on young children); therefore, it seems more likely that graphically displayed warnings will influence their health beliefs. In addition, although adolescents seem to know some of the risks of cancer from smoking, they do not have a realistic knowledge of smoking's addictive nature and other relative risks (Jamieson and Romer 2001). Interventions that affect health beliefs are particularly important because adolescent smokers often try to justify their smoking by modifying their attitudes and beliefs to a more positive view of smoking (Botvin, Botvin, and Baker 1983).

H_3: The perceived graphicness of the warning label is positively related to negative health beliefs about smoking.

Smoking frequency → negative health beliefs about smoking. Although we expect that increasing the graphicness of the warning can positively affect negative health beliefs about smoking, we anticipate that for *adolescent smokers*, smoking frequency will be negatively related to these negative health beliefs. Research from the stage model of smoking acquisition suggests that during the early stages of smoking (e.g., preparation, experimentation), adolescents begin to form their first beliefs about the health consequences of smoking (Wang et al. 1996). Interventions targeting adolescents at the low smoking frequency stage tend to be more effective in influencing health beliefs about smoking than at more advanced stages of smoking (i.e., habituation and maintenance), when addiction sets in (Harken 1987). Thus, when exposed to an antitobacco health message, as smoking frequency increases for adolescents, negative health beliefs about smoking should decrease.

Other literature also suggests a negative frequency of smoking → negative health beliefs effect. First, central route (and biased) processing may occur for more frequent smokers exposed to antismoking messages over time because of reactance/defensiveness, the public stigma toward smoking, expected negative initial opinions, and counterargumentation (Eagly and Chaiken 1993; Petty and Cacioppo 1986; Slovic 2000). Second, research has found adolescent smoking frequency to be negatively related to one's motivation to quit (Turner, Veldhuis, and Mermelstein 2005). Third, and consistent with our H_2 rationale, as the frequency of a behavior increases, the potential negative health consequences tend to be discounted, leading to a behavioral frequency → negative health beliefs path that is negative (Eagly and Chaiken 1993; McGuire 1980). Thus, as smoking frequency increases for many of these beginning adolescent smokers, negative health beliefs (i.e., general perceived risks) about smoking should be less likely (Andrews et al. 2004; Brown, Carpenter, and Sutfin 2011; Tormala and Petty 2004).

H_4: Frequency of smoking is negatively related to negative health beliefs about smoking.

Relationships Among Evoked Fear, Negative Health Beliefs, and Thoughts of Quitting

Evoked fear → negative health beliefs. Beliefs and emotions have long played a role in how consumers develop intentions and behaviors with respect to exposure to ads and persuasive communications (cf. Burke and Edell 1989; Petty and Cacioppo 1986). Some have cited the importance of a separate, and even dominant, role for emotions in preference formation and intention (cf. Zajonc 1980), whereas others have noted affective emotion's role as a precursor to beliefs (Burke and Edell 1989, p. 70; Petty and Cacioppo 1986, p. 206). Indeed, recent evidence has suggested that ad-based images inducing both fear and the emotion of disgust positively influence persuasion and compliance associated with avoiding illicit drug use, shunning bottled water with chemicals, and encouraging the use of sunscreen (Morales, Wu, and Fitzsimons 2012). Thus, for adolescents, we anticipate that the greater the evoked fear from exposure to a graphic warning, the greater their negative health beliefs associated with smoking (e.g., general beliefs regarding addiction, disease risk, harm to children).

H_5: Evoked fear is positively related to negative health beliefs about smoking.

Evoked fear, negative health beliefs → thoughts of quitting. Research evidence over the years has suggested a positive linear relationship between evoked fear and behavioral acceptance of a warning message (cf. Janis and Leventhal 1968; Leventhal 1970). In a review of more than 100 articles on research and conceptualizations of fear appeals, Witte and Allen (2000, p. 601) conclude that "the stronger the fear aroused by a fear appeal, the more persuasive it is." More recently, Kees et al. (2010) show that the more graphic the visual warning depictions, the greater the evoked fear and resulting quit intentions for older adult smokers. We anticipate similar effects for adolescents.

However, and as we noted previously, beliefs about the health consequences of smoking also can be a key variable

related to the persuasiveness of the warnings. Prior smoking research has indicated that health beliefs about smoking are important psychological factors that influence adolescent decisions about smoking (Peracchio and Luna 1998). Moreover, survey work has shown that graphic visual warnings can increase cognitive processing of the labels, with more frequent reading, attention, thinking, and talking about the warning labels after exposure (White, Webster, and Wakefield 2008). This finding suggests a positive relationship between general beliefs about the health consequences of smoking and thoughts of quitting. Thus, we predict a positive influence for both negative health beliefs about smoking and evoked fear on thoughts of quitting.

H_6: Both (a) evoked fear and (b) negative health beliefs about smoking are positively related to thoughts of quitting.

Incremental Effects of Graphicness and the Moderating Role of Smoking Frequency

Figure 1 suggests that fear and negative health beliefs will (partially) mediate the direct effect of graphicness on thoughts of quitting. This is consistent with the literature on the effects of fear on persuasion (Witte and Allen 2000) and their influence on adults' smoking intentions (Kees et al. 2010). Similarly, there are arguments in the antismoking literature that smoking beliefs will partially mediate the effects of antismoking ad appeals on adolescent intentions to smoke (cf. Andrews et al. 2004). Despite these potential mediating roles, we propose a critical role of warning graphicness and its interaction term with smoking frequency (i.e., the moderating role of smoking frequency) in producing effects on thoughts of quitting *beyond those* observed for evoked fear and negative health beliefs about smoking.

Prior research has suggested the importance of highly graphic stimuli on persuasion and communication effectiveness (*Federal Register* 2011). For example, it has been noted that "vivid and often gruesome pictures," as part of health- and risk-related manipulations, are highly effective in evoking fear and strengthening the effectiveness of persuasive attempts (Morales, Wu, and Fitzsimons 2012; Witte and Allen 2000, pp. 602–603). Graphic and gruesome pictures have the potential to be viewed as more novel and considered more carefully than other message features, and this may increase thoughts of quitting (Biener et al. 2004). In addition, other findings have shown increasing monotonic effects of more graphic visuals related to oral cancers on quit intentions for adult smokers (Kees et al. 2010). Thus, we anticipate that strengthening the perceived graphic level of pictorial stimuli will be positively related to thoughts of quitting that extend beyond the effects of both evoked fear and beliefs.

H_7: The perceived graphicness of the warning label *incrementally* influences thoughts of quitting, extending beyond the effects of evoked fear and negative health beliefs about smoking.

Still, we also anticipate that this relationship will vary across adolescents' degree of smoking frequency. Thoughts of quitting are less likely for more committed (i.e., regular) adolescent smokers, and less committed (i.e., occasional or infrequent) smokers may be somewhat more susceptible to persuasive antismoking communications (Turner, Veldhuis, and Mermelstein 2005). Moreover, smoking intent and behavior vary by stage of smoking progression, with early-stage experimental smokers showing more malleable intentions about smoking. Thus, smoking interventions such as graphic warning labels have a greater likelihood of influencing smokers who are in the experimental stage and those who smoke less frequently (Wang et al. 1996).

Furthermore, and consistent with theories of reactance, fear-arousing, graphic content may result in a self-protective response in which those who engage most often in unhealthy behaviors may discount the graphic warning, thus reducing its effectiveness (McGuire 1980). Research has shown such "minimizing" of a graphic warning to be a common defensive reaction to engaging in unhealthy behaviors (Eagly and Chaiken 1993). We predict that as smoking frequency increases, the positive effect of graphic visuals in promoting thoughts of quitting will be attenuated as a result of greater resistance from entrenched beliefs and attitudes (Tormala and Petty 2004; Wegener et al. 2004).

H_8: Frequency of smoking moderates the effect of perceived graphicness of the warning on thoughts of quitting. As frequency of adolescent smoking increases, the positive effect of graphicness is reduced, indicating a negative graphicness × frequency of smoking interaction.

STUDY 1: METHOD

Pilot Study

A pilot study tested an array of pictures across warning types that displayed differences in perceived graphicness and were viewed as consistent with three of the warning statements for packaging required by the Family Smoking Prevention and Tobacco Control Act (2009). The visuals tested were representative of the following three mandated warning statement themes: (1) "Cigarettes are addictive," (2) "Tobacco smoke can harm your children," and (3) "Cigarettes cause fatal lung disease." Participants were adolescents ranging in age from 13 to 18 years, and a stratified sampling technique was employed based on Monitoring the Future smoking data for U.S. adolescents (16% aged 13–14 years, 33% aged 15–16 years, and 51% aged 17–18 years). An approximately equal number of participants were sampled for gender. Their participation was obtained through a professional online market research firm specializing in adolescent samples. A double-consent procedure was used; permission to participate was first obtained from parents before obtaining consent from the adolescents. Then, to qualify as a smoker, a respondent had to have smoked a cigarette in the past 30 days. A total of 104 adolescent smokers (approximately 35 for each of the warning statement type) participated in the pilot study.

Each adolescent was exposed to nine separate visuals corresponding to one of the three warning statements (i.e., there were 27 pictures in total across the three warning statement themes). Following exposure, participants responded to a set of questions pertaining to graphic perceptions of the pictorial warning and perceived consistency with the warning statement. For graphic level, participants evaluated each picture on two seven-point scales ranging from "not graphic at all" to "very graphic" and "not intense

at all" to "very intense" (Kees et al. 2010). The correlation between the items was .95.

On the basis of these pilot study results, we selected three visuals for each warning statement for the main study that displayed significant differences in perceived graphicness and were viewed as consistent with the statement of the warning message. The standardized means for the selected visuals on perceived graphicness are as follows: (1) addiction: "rain" (–1.83), "brain" (.09), and "hole" (2.53); (2) harm to children: "baby and smoke" (–.47), "baby and cigarettes" (.37), and "boy crying" (1.60); and fatal lung disease: "coughing" (–1.92), "cigarettes in lungs" (.13), and "side by side lungs" (1.77). The Appendix shows examples of the stimuli selected for the studies.

Main Study Method

Procedures and sample. Participants (aged 13–18 years) were recruited in a manner similar to the pilot study; that is, we first obtained permission to participate from parents before obtaining consent from the participants. The same online market research firm used in the pilot study was used for the main study. We used stratified sampling to match Monitoring the Future adolescent smoking data in the United States for the age categories of 13–14 years, 15–16 years, and 17–18 years. The sample was approximately 50% male and 50% female. Participants were told they "will be asked to view a cigarette package" and then instructed to "go to the next section of the study where you will be asked a number of different questions about your opinion of the package," without referring to anything related to specific warning information. Package information shown other than the text and visual warnings was invariant across conditions (e.g., the number of cigarettes in the package and brand information were all consistent). Each participant was randomly assigned to a single package containing one of nine pictorial warnings from the pilot test and the accompanying text warning statement (for examples of the study stimuli, see the Appendix). The study measures, demographics, and control variables followed the stimuli (see the Web Appendix). The total number of participants was 145 adolescent smokers.

Measures. We measured the perceived graphicness of the warning with four seven-point items ("not graphic at all/very graphic," "not vivid at all/extremely vivid," "very weak/very powerful," and "not intense at all/very intense"; coefficient $\alpha = .95$ [Kees et al. 2010]). Four seven-point items assessed evoked fear ("not fearful at all/very fearful," "not anxious at all/very anxious," "not nervous at all/very nervous," and "not afraid at all/very afraid"; coefficient $\alpha = .95$ [Passyn and Sujan 2006]). Negative beliefs about the health consequences of smoking were measured with six seven-point items anchored by "strongly disagree" and "strongly agree": (1) "Smoking is addictive," (2) "Smoking causes lung cancer," (3) "Secondhand smoke harms children," (4) "Nicotine is physically addictive," (5) "Smoking increases a person's risk of getting lung cancer," and (6) "Secondhand smoke is dangerous to children" (coefficient $\alpha = .93$). We assessed thoughts of quitting using four items: (1) "The information shown on the cigarette package would help me quit smoking," (2) "The information shown on the cigarette package motivates me to quit smoking," (3) "How important is it for you to quit smoking?" and (4) "How often do you think about quitting smoking?" The first two items were evaluated on "strongly disagree/strongly agree" scales, the third item was anchored by "not important at all" and "very important," and the fourth item was anchored by "not often at all" and "very often" (coefficient $\alpha = .86$). We measured frequency of smoking with the question, "In the past 30 days how often have you smoked?" Responses were as follows: 10% stated that they smoked 1–2 days, 19% stated 3–5 days, 17% stated 6–9 days, 17% stated 10–19 days, 9% stated 20–29 days, and 28% stated that they smoked all 30 days.

We also collected several other single-item measures as potential control variables: (1) measures of the emotions of guilt, anger, sadness, shame, remorse, upset, and disgust in response to viewing the warning and (2) the potential reasons for smoking, including smoking for pleasure, smoking to reduce stress, and smoking in a social context. Finally, demographic control variables included age, gender (1 = male, 0 = female), and race/ethnicity (1 = Caucasian, 0 = other). We also determined whether there was a smoking adult in the household (1 = yes, 0 = no), if any siblings were smokers (1 = yes, 0 = no), and the number of close friends (up to four) that smoked. Table 1 shows summary statistics and correlations for Study 1 variables retained for the models estimated in the following section.

STUDY 1: ANALYSIS AND RESULTS

Data Checks

We used path analysis to test the hypothesized relationships. This required pooling the data across the levels of graphic warnings; thus, it was necessary to establish that the variances and covariances among the key model constructs did not differ across levels. We estimated a series of multigroup models with LISREL 8 (Jöreskog and Sörbom 1996), in which the base model freely estimated all variances/covariances among graphicness, evoked fear, negative health beliefs, and thoughts of quitting. Given the saturated nature of this model, it was perfectly fitted with no degrees of freedom. More importantly, we compared the base model with a model in which all variances/covariances were constrained to be equal across groups. This "phi" invariant did not differ in fit from the base model ($\chi^2_{diff.} = 13.98$, d.f. = 20, $p = .76$), indicating that construct variances/covariances did not differ across groups. Within the graphic warning levels, we also had themes of addiction, disease, and secondhand smoke. Multigroup invariance tests also showed no significant differences among the variances and covariances for the key study constructs across themes (the "phi"-invariant model did not differ in fit from that of a base model; $\chi^2_{diff.} = 30.95$, d.f. = 20, $p > .05$).

Path Analyses Results and Tests of Hypotheses

Control paths. We first estimated a model in which all control variables were allowed to be predictors of all dependent variables. The primary purpose of this model was to estimate models more parsimoniously with hypothesized effects by only retaining those control variables that had significant effects on the dependent variables. We conducted this procedure simultaneously with the Study 2 data by first estimating a model with all the control measures (and demographics) predicting fear, negative health beliefs,

Table 1

STUDY 1: SUMMARY STATISTICS AND CORRELATIONS AMONG CONSTRUCTS

	Mean	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*
1. Graphicness	4.20	1.74	1.0													
2. Evoked fear	3.48	1.79	.56	1.0												
3. Negative health beliefs	5.50	1.29	.34	.31	1.0											
4. Quit thoughts	3.90	1.63	.59	.70	.41	1.0										
5. Smoking frequency	4.75	1.78	–.08	–.19	–.08	–.16	1.0									
6. Siblings smoke	.29	.45	–.03	–.16	.05	–.14	.30	1.0								
7. Adult smoker	.57	.50	.15	–.05	.14	.06	.02	.12	1.0							
8. Friends smoke	3.61	1.13	–.19	–.23	–.15	–.32	.24	.10	.02	1.0						
9. Gender	.45	.50	–.13	–.27	–.01	–.21	.17	–.02	.01	.09	1.0					
10. Age	16.80	1.46	–.01	–.09	.10	–.05	.21	.17	.02	–.05	–.14	1.0				
11. Guilt	4.26	2.10	.49	.45	.38	.45	.06	.01	.14	–.01	–.05	.03	1.0			
12. Remorse	3.81	1.95	.51	.48	.36	.50	.00	–.07	.02	–.03	–.19	–.04	.73	1.0		
13. Pleasure	4.54	1.53	–.05	–.07	.00	–.17	.23	.08	–.16	.23	.09	.05	.08	–.12	1.0	
14. Smoke social	2.63	.81	–.03	–.06	–.07	–.22	–.20	.04	.15	.24	.05	–.18	–.10	–.12	–.02	1.0

Notes: n = 145. In general, correlations greater than or equal to .16 in absolute value are significant ($p < .05$).

and quit thoughts. We then retained only those paths from these constructs that were significant in at least one of the two study samples. We conducted this retention procedure to permit valid path comparisons across the samples in subsequent analyses. From this procedure, we retained the emotions of guilt and remorse; the reasons of smoking for pleasure and smoking in a social context; and the demographics of gender, age, number of friends who smoke, and having an adult smoker in the household. Table 2 ("Control Paths") shows the control paths retained across both studies.

Initial model. We next estimated an "initial model" that simultaneously tests H_1–H_{6b}. This initial model, depicted by the solid-line paths in Figure 1, does not assess the direct effects of graphicness or the graphicness × smoking frequency interaction on thoughts of quitting (for clarity purposes, we omitted control paths). All exogenous variables were mean-centered before model estimation, and we created a product term to model the graphicness × frequency of smoking interaction effect. Along with the control variable paths, we included this interaction effect as a control variable for the prediction of evoked fear and negative health beliefs.

Table 2
STUDY 1 ADOLESCENTS: INCREMENTAL EFFECTS MODEL RESULTS

	Coefficient		*t-Value*
Hypothesized Paths: Initial Model			
H_1: Graphicness → fear	.35	(.34)	4.29**
H_2: Smoking frequency → fear	–.12	(–.12)	1.78*
H_3: Graphicness → negative health beliefs	.08	(.10)	1.08
H_4: Smoking frequency → negative health beliefs	–.10	(–.14)	1.73*
H_5: Fear → negative health beliefs	.15	(.20)	2.13*
H_{6a}: Fear → quit thoughts	.41	(.45)	6.89**
H_{6b}: Negative health beliefs → quit thoughts	.19	(.16)	2.80**
Hypothesized Paths: Incremental Effects Model			
H_7: Graphicness → quit thoughts	.16	(.17)	2.67**
H_8: Graphicness × smoking frequency → quit thoughts	–.09	(–.17)	3.36**
Control Paths			
Gender → fear	–.58	(–.16)	2.36**
Number of friends smoke → fear	–.16	(–.10)	1.51
Graphicness × smoking frequency → fear	.00	(.02)	.13
Guilt → fear	.17	(.20)	1.98*
Remorse → fear	.10	(.11)	1.09
Gender → negative health beliefs	.27	(.10)	1.29
Age → negative health beliefs	.19	(.21)	2.65**
Adult smoker in household → negative health beliefs	.45	(.17)	2.28*
Graphicness × smoking frequency → negative health beliefs	.02	(.02)	.54
Remorse → negative health beliefs	.15	(.23)	2.43**
Gender → quit thoughts	–.18	(–.05)	1.04
Number of friends smoke → quit thoughts	–.15	(–.10)	1.85*
Smoking frequency → quit thoughts	–.02	(–.02)	.36
Pleasure → quit thoughts	–.15	(–.14)	2.71**
Smoke socially → quit thoughts	–.28	(–.14)	2.62**
Remorse → quit thoughts	.13	(.16)	2.45**
R-squared (fear)	.43		
R-squared (negative health beliefs)	.28		
R-squared (quit thoughts)	.68		

*$p < .05$.
**$p < .01$.
Notes: Unstandardized coefficients are not parenthesized; standardized coefficients are parenthesized.

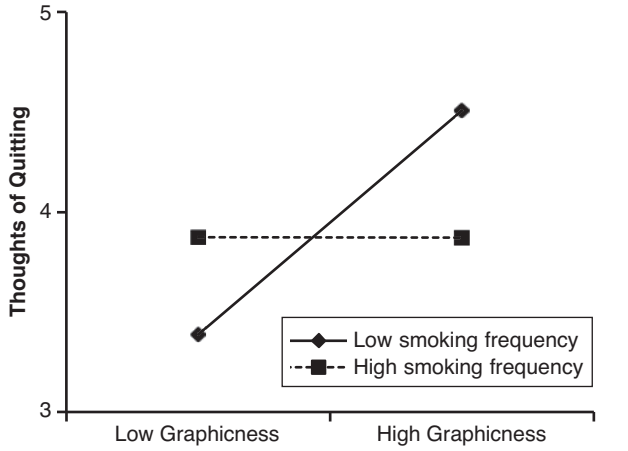
This model fit the data marginally well ($\chi^2 = 30.70$, d.f. = 14, $p < .01$; comparative fit index [CFI] = .94; nonnormed fit index [NNFI] = .86; and root mean square error of approximation [RMSEA] = .09). Graphicness was positively related to evoked fear ($\gamma = .35$, t = 4.29, $p < .01$), and smoking frequency was negatively related to evoked fear ($\gamma = –.12$, t = 1.78, $p < .05$). These results support H_1 and H_2. Graphicness was not significantly related to negative health beliefs ($\gamma = .08$, t = 1.08, $p > .05$; H_3 not supported), but the effect of smoking frequency on negative health beliefs was significant ($\gamma = –.10$, t = 1.73, $p < .05$; H_4 supported). In turn, H_5 was supported, as evoked fear was positively related to negative health beliefs ($\beta = .15$, t = 2.13, $p < .05$). Next, both evoked fear ($\beta = .48$, t = 8.05, $p < .01$) and negative health beliefs about smoking ($\beta = .20$, t = 2.78. $p < .01$) were related to thoughts of quitting. These results support H_{6a} and H_{6b}. This initial model explained 43% of the variance in evoked fear, 28% of the variance in health beliefs, and 63% of the variance in thoughts of quitting.

Incremental effects model. We added three paths to the initial model to create the "incremental effects model," depicted by the dotted-line paths in Figure 1: (1) the hypothesized direct path from graphicness to thoughts of quitting, (2) the hypothesized direct path from the graphicness × smoking frequency interaction to thoughts of quitting, and (3) the direct control path from smoking frequency to thoughts of quitting necessary to appropriately assess the significance of the interaction term (not shown in Figure 1 for clarity purposes). This model fit the data well ($\chi^2 = 9.22$, d.f. = 11, $p = .37$; CFI = .99; NNFI = .98; and RMSEA = .02), and was better fitted than the initial model ($\chi^2_{diff.} = 21.48$, d.f. = 3, $p < .01$). Table 2 shows that the graphicness → thoughts of quitting path ($\gamma = .16$, t = 2.67, $p < .01$) was significant and positive, in support of H_7. Frequency of smoking negatively moderated the positive graphicness effect ($\gamma = –.09$, t = 3.36, $p < .01$), in support of H_8. This incremental effects model explained 68% of the variance in thoughts of quitting (R^2 change = .05; $p < .01$).

To better understand the nature of the H_8 moderating effect, we plotted the graphicness × frequency of smoking interaction for thoughts of quitting. Figure 2 shows the plot of graphicness on predicted thoughts of quitting at a high level of smoking frequency (1 SD above its mean) and a low level of smoking frequency (1 SD below its mean). The primary comparison of interest is low versus high smoking frequency when warning graphicness is high. As Figure 2 shows, the predicted mean score on thoughts of quitting was highest when smoking frequency was low and graphicness level was high (M = 4.51). At levels of both high smoking frequency and high graphicness, the predicted mean score on thoughts of quitting was 3.88. Thus, the positive effect of graphicness on thoughts of quitting is evident across smoking frequency levels, but it is reduced when smoking frequency is higher as compared with lower levels.

Indirect effects and partial mediation. Given that we have shown that graphicness and its interaction with smoking frequency directly affect quit thoughts in the presence of evoked fear and negative health beliefs (which also affect quit thoughts), only partial mediation is possible. Although there are numerous influential writings on mediation (full and partial), it is now generally accepted that only two conditions are necessary for mediation: (1) the independent

Figure 2
STUDY 1: THE MODERATING INFLUENCE OF SMOKING FREQUENCY ON THE GRAPHICNESS → QUIT THOUGHTS EFFECT FOR ADOLESCENT SMOKERS



Notes: For adolescent smokers, the predicted mean score on thoughts of quitting was highest when smoking frequency was low and graphicness was high (4.51, SD = 1.82); at high levels of both smoking frequency and graphicness, the predicted mean score on thoughts of quitting was 3.88 (SD = 1.77). Thus, the positive effect of graphicness on thoughts of quitting is attenuated when smoking frequency is higher (vs. lower). The low–low mean score for quit thoughts was 3.39 (SD = 1.80), and the high smoking frequency/low graphicness mean score was 3.88 (SD = 1.85).

variable(s) affect the mediator(s) and (2) the mediator(s) affect the dependent variable (Kenny 2013; MacKinnon 2008; Preacher and Hayes 2008). Furthermore, in contemporary mediation analyses with multiple mediators, the significance of the total indirect effect of the independent variable on the dependent variable assesses mediation. As is evident in Figure 1, we have multiple potential mediators, and as such we used an approach similar to that recommended by Preacher and Hayes (2008).

First, given that the first condition has not been met with respect to the indirect effect of the graphicness × frequency of smoking interaction on quit thoughts (i.e., the graphicness × frequency of smoking interaction → negative health beliefs and the graphicness × frequency of smoking interaction → fear paths are not significant), no mediation is possible, and the total indirect effect of the graphicness × frequency of smoking interaction on quit thoughts was not significant ($\gamma = -.01$, $t = .31$, $p > .10$). However, both mediating conditions were met for the partial mediation of graphicness on quit thoughts through evoked fear; that is, the graphicness → fear path was significant ($\gamma = .35$, $t = 4.29$, $p < .01$), as was the fear → quit thoughts path ($\beta = .41$, $t = 6.89$, $p < .01$). The total indirect effect of graphicness on quit thoughts was significant ($\gamma = .16$, $t = 3.88$, $p < .01$), in support of the notion that evoked fear partially mediates the effect of graphicness on thoughts of quitting.

STUDY 1: DISCUSSION

In summary, for adolescent smokers, graphicness was related to evoked fear but not directly related to negative health beliefs about smoking; smoking frequency was related to both evoked fear and negative health beliefs. In addition, evoked fear was related to negative health beliefs, and both fear and negative health beliefs were related to thoughts of quitting. An incremental effects model showed further that graphicness directly influences thoughts of quitting, and smoking frequency serves to moderate the positive impact of graphicness on thoughts of quitting.

Although these effects largely support our hypotheses for adolescents, questions still remain regarding these effects for *young adults*, for whom smoking addiction and more entrenched smoking beliefs are likely. For example, although regular smokers are more likely to have tried cigarettes before 18 years of age, numerous studies have shown that smoking escalation and addiction are most prevalent in young adulthood (aged 19 years to late twenties) (Chassin et al. 2001; Costello et al. 2008). Thus, will the effects found in Study 1 differ for a sample of young adult smokers with greater smoking experience, greater smoking frequency, and an increased likelihood of more entrenched beliefs about the health consequences of smoking? In addition, will exposure to more graphic warnings have effects on negative health beliefs and thoughts of quitting when these important outcomes are measured at a time subsequent to the warning exposure? Study 2 explores these questions.

STUDY 2: METHOD

Study 2 used a longitudinal design over a one-week period (Time 1 and Time 2) to test the same model and hypotheses examined in Study 1. At Time 1 for Study 2, we exposed 240 young adult smokers to one of the same three cigarette packages with graphic warnings, as in Study 1. These 240 participants were recruited from a national online subject pool. After consent and exposure to the graphic warning labels, participants were again instructed to answer questions about their "opinions regarding the package of cigarettes" without referring to anything related to specific warning information. Package information other than the visual warnings and text was again invariant across conditions, and each participant was again randomly assigned to one of the nine pictorial warnings and its accompanying text warning statement. Of the 240 respondents, 238 gave complete survey responses.

At Time 1, participants responded to the same perceived graphicness ($\alpha = .94$), evoked fear ($\alpha = .95$), smoking frequency, and control measures (e.g., guilt and remorse emotions, potential reasons for smoking—smoking is pleasurable and smoking in a social context) used in Study 1. Responses to the smoking frequency measure were as follows: 13% stated that they smoked 1–2 days, 7% stated 3–5 days, 7% stated 6–9 days, 20% stated 10–19 days, 13% stated 20–29 days, and 40% stated that they smoked all 30 days. Time 1 demographic control variables included age (average = 25 years), gender (51% were male; 1 = male, 0 = female), and race/ethnicity (78% were Caucasian; 1= Caucasian, 0 = other). We also measured and coded the same demographics of Study 1.

One week later (Time 2), 150 of these 238 initial participants responded to the same negative health beliefs about smoking ($\alpha = .76$) and thoughts of quitting measures ($\alpha = .84$) used in Study 1. Table 3 shows summary statistics and correlations among Study 2 variables (retained for further analysis) for the 150 participants who responded to surveys at both Time 1 and Time 2. Although the focus of Study 2

Table 3

STUDY 2: SUMMARY STATISTICS AND CORRELATIONS AMONG CONSTRUCTS

	Mean	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*
1. Graphicness	4.25	1.97	1.0													
2. Evoked fear	3.41	1.78	.59	1.0												
3. Negative health beliefs	6.17	.76	.14	.21	1.0											
4. Quit thoughts	4.32	1.50	.42	.49	.35	1.0										
5. Smoking frequency	5.33	1.77	−.03	−.17	.04	−.16	1.0									
6. Siblings smoke	.30	.46	.13	−.02	−.03	−.14	.14	1.0								
7. Adult smoker	.42	.49	.13	−.09	−.04	.06	.27	.30	1.0							
8. Friends smoke	3.02	1.27	.12	−.06	.14	−.32	.33	.22	.34	1.0						
9. Gender	.51	.50	.03	−.06	−.16	−.21	−.04	.03	−.03	.09	1.0					
10. Age	24.87	3.81	.08	−.03	.10	.16	.20	.14	−.01	−.05	.02	1.0				
11. Guilt	3.85	2.29	.52	.60	.28	.46	−.05	−.05	−.09	.07	.01	.00	1.0			
12. Remorse	3.40	2.04	.47	.57	.28	.47	−.06	−.05	−.05	.04	.02	−.03	.75	1.0		
13. Pleasure	5.08	1.46	−.05	−.10	−.04	−.14	.30	−.03	.05	.12	.07	.16	.00	−.02	1.0	
14. Smoke social	2.36	.73	.00	−.06	−.06	−.05	−.28	−.03	.01	.29	−.01	−.03	−.04	−.11	−.12	1.0

Notes: n = 150. In general, correlations greater than or equal to .15 in absolute value are significant ($p < .05$).

was to examine effects of the graphic warnings for young adults over time, we did measure all constructs (i.e., graphicness, smoking frequency, evoked fear, negative health beliefs, and quit thoughts) and the control measures at Time 1 to permit a direct comparison with Study 1 results. Table 4 presents these data, which we discuss subsequently.

STUDY 2: ANALYSIS AND RESULTS

Initial Data Checks

To assess whether pooling the data across graphic warning levels and themes would be appropriate, we again estimated a series of multigroup models using LISREL 8. For graphic warning level, the base model freely estimated all variances/covariances among graphicness, evoked fear, negative health beliefs, and thoughts of quitting. We compared this base model with a model in which all variances and covariances among these constructs were constrained to be equal across groups. This "phi"-invariant model did not differ in fit from that of the base model ($\chi^2_{diff.} = 16.30$, d.f. = 20, $p = .70$), suggesting that construct variances/covariances did not differ across groups. For the three negative health belief themes of addiction, disease, and secondhand smoke, multigroup invariance tests also showed no significant differences among the variances/covariances for the key study constructs. The "phi"-invariant model did not differ in fit from that of a base model ($\chi^2_{diff.} = 13.83$, d.f. = 20, $p = .84$).

Path Analyses Results and Tests of Hypotheses

Control paths. We first estimated a model in which all exogenous control variables were allowed to be predictors of all dependent variables. As previously noted, we conducted these analyses simultaneously with the Study 1 data, and we retained only the control variable paths that were significant in at least one of the two studies. From this procedure, we retained the emotions of guilt and remorse, the reasons of smoking for pleasure and smoking in a social context, and the demographics of gender, age, number of friends who smoke, and presence of an adult smoker in the household.

Initial model. We next estimated the initial model (depicted by the solid-line arrows in Figure 1), simultaneously testing H_1–H_{6b}. All exogenous variables were mean-centered before model estimation, and we created a product term for the perceived warning label graphicness × frequency of smoking interaction effect. In addition to the previously mentioned control variable paths, we included this

Table 4
STUDY 2 YOUNG ADULTS: INCREMENTAL EFFECTS MODEL RESULTS

	Longitudinal (T1, T2)		*Cross-Sectional (T1)*	
	Coefficient	*t-Value*	*Coefficient*	*t-Value*
Hypothesized Paths: Initial Model				
H_1: Graphicness → fear	.35 (.38)	5.47**	.27 (.29)	5.15**
H_2: Smoking frequency → fear	–.12 (–.12)	1.98*	–.14 (–.13)	2.64*
H_3: Graphicness → negative health beliefs	–.03 (–.08)	.79	.05 (.07)	.99
H_4: Smoking frequency → negative health beliefs	.02 (.06)	.67	.04 (.07)	1.05
H_5: Fear → negative health beliefs	.04 (.10)	.93	.01 (.01)	.17
H_{6a}: Fear → quit thoughts	.19 (.22)	2.41*	.40 (.47)	8.14*
H_{6b}: Negative health beliefs → quit thoughts	.57 (.29)	4.06**	.47 (.23)	4.90**
Hypothesized Paths: Incremental Effects Model				
H_7: Graphicness → quit thoughts	.13 (.17)	2.03*	.02 (.03)	.55
H_8: Graphicness × smoking frequency → quit thoughts	–.05 (–.12)	1.74*	.06 (–.13)	2.89**
Control Paths				
Gender → fear	–.25 (–.07)	1.17	–.44 (–.12)	2.46*
Number of friends smoke → fear	–.13 (–.09)	1.45	–.01 (–.01)	.02
Graphicness × smoking frequency → fear	.02 (.04)	.69	.03 (.04)	.92
Guilt → fear	.20 (.25)	2.72**	.27 (.33)	4.40**
Remorse → fear	.17 (.20)	2.19*	.13 (.15)	2.04*
Gender → negative health beliefs	–.27 (–.18)	2.31*	–.45 (–.24)	1.95*
Age → negative health beliefs	.03 (.16)	1.98*	.03 (.12)	.92
Adult smoker in house → negative health beliefs	–.06 (–.04)	.48	–.16 (–.08)	1.30
Graphicness × smoking frequency → negative health beliefs	.04 (.16)	2.01*	.04 (.12)	1.98*
Remorse → Negative health beliefs	.10 (.26)	2.67**	.08 (.17)	2.33*
Gender → quit thoughts	.46 (.15)	2.29*	.06 (.05)	.41
Number of friends smoke → quit thoughts	–.15 (–.13)	1.69*	–.05 (–.04)	.83
Smoking frequency → quit thoughts	–.02 (–.02)	.27	–.02 (–.03)	.55
Pleasure → quit thoughts	–.08 (–.07)	1.08	–.15 (–.14)	3.17**
Smoke socially → quit thoughts	.05 (.02)	.32	.13 (.06)	1.22
Remorse → quit thoughts	.14 (.19)	2.31*	.13 (.17)	2.71**
R-squared (fear)	.53		.46	
R-squared (negative health beliefs)	.18		.16	
R-squared (quit thoughts)	.41		.59	

*$p < .05$.
**$p < .01$.
Notes: For the longitudinal analyses (n = 150), participants assessed negative health beliefs and quit thoughts one week following exposure (i.e., at Time 2) to the package stimulus and provided responses to the smoking frequency, graphicness, and fear questions (i.e., at Time 1). For the cross-sectional study (n = 238), all measures were assessed at Time 1. Unstandardized coefficients are not parenthesized; standardized coefficients are parenthesized.

interaction effect as a control variable for the prediction of evoked fear and negative health beliefs.

This model fit the data well ($\chi^2 = 19.19$, d.f. = 14, $p = .16$; CFI = .99; NNFI = .97; and RMSEA = .05). As we hypothesized, graphicness was positively related to evoked fear ($\gamma = .35$, t = 5.47, $p < .01$), and smoking frequency was negatively related to evoked fear ($\gamma = -.12$, t = 1.98, $p < .05$), in support of H_1 and H_2. However, the graphicness → negative health beliefs path was not significant ($\gamma = -.03$, t = .79, $p > .10$), nor were the effects of smoking frequency on negative health beliefs ($\gamma = .02$, t = .67, $p > .10$) or evoked fear on negative health beliefs ($\beta = .04$, t = .93, $p > .05$). Thus, H_3–H_5 were not supported. Both evoked fear ($\beta = .26$, t = 3.70, $p < .01$) and negative health beliefs ($\beta = .50$, t = 3.57, $p < .01$) were related to quit thoughts. These results support H_{6a} and H_{6b}. This initial model explained 53% of the variance in evoked fear, 18% of the variance in negative health beliefs, and 38% of the variance in quit thoughts.

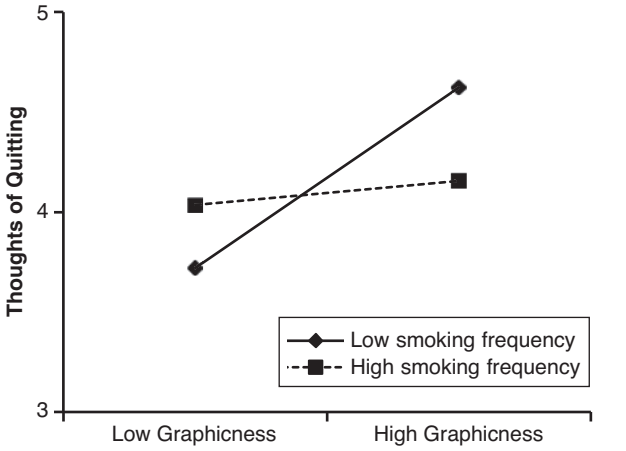
Incremental effects model. The incremental effects model added (1) the hypothesized direct path from graphicness to thoughts of quitting, (2) the hypothesized direct path from the graphicness × smoking frequency interaction to thoughts of quitting, and (3) the direct control path from smoking frequency to thoughts of quitting. This model fit the data well ($\chi^2 = 11.92$, d.f. = 14, $p = .50$; CFI = .99; NNFI = .95; and RMSEA = .01) and was a marginally better fit than the initial model ($\chi^2_{diff.} = 7.27$, d.f. = 3, $p < .10$). The longitudinal columns in Table 4 show the results (we address the cross-sectional columns subsequently). As we predicted, the graphicness → thoughts of quitting path ($\gamma = .13$, t = 2.03, $p < .05$) was significant and positive (H_7), and smoking frequency negatively moderated the positive graphic warning effect on thoughts of quitting ($\gamma = -.05$, t = 1.74, $p < .05$). This incremental effects model explained 41% of the variance in thoughts of quitting.

We again plotted the graphicness × smoking frequency interaction effect. As Figure 3 shows, the predicted mean score on thoughts of quitting was highest when smoking frequency was low and graphicness level was high (M = 4.62). At levels of both high smoking frequency and high graphicness, the predicted mean score on thoughts of quitting was 4.16. Thus, as we predicted, the positive effect of the graphic level of the visual on thoughts of quitting again is reduced when smoking frequency is higher as compared with when it is lower.

Indirect effects and partial mediation. As with Study 1, graphicness and its interaction with smoking frequency directly affected thoughts of quitting; thus, only partial mediation is possible. We again have two potential partial mediators of the graphicness → quit thoughts and graphicness × smoking frequency → quit thoughts paths; that is, evoked fear and negative health beliefs. Given that the evoked fear → negative health beliefs path is nonsignificant ($\beta = .04$, t = .93, $p > .10$), it cannot play a role in any mediating analyses (Kenny 2013; MacKinnon 2008). Furthermore, because the graphicness → negative health beliefs ($\gamma = -.03$, t = .79, $p > .10$) and graphicness × smoking frequency → evoked fear paths are not significant ($\gamma = .02$, t = .69, $p > .10$), these paths cannot partially mediate the effects of graphicness and graphicness × smoking frequency on quit thoughts, respectively.

There are only two possible routes for partial mediation: (1) graphicness → evoked fear → quit thoughts and (2) graphicness × smoking frequency → negative health beliefs → quit thoughts, because all paths in these two chains of effects are significant. Still, because there are multiple (different) mediators present (evoked fear and negative health beliefs) with multiple (different) independent variables (graphicness and graphicness × smoking frequency), we again report the total indirect effect of the multiple mediators as evidence of partial mediation (Kenny 2013; MacKinnon 2008). The total indirect effect of graphicness on quit thoughts is not significant ($\gamma = .06$, t = 1.54, $p > .05$), suggesting no partial mediation. However, the total indirect effect of graphicness × smoking frequency on quit thoughts is significant ($\gamma = .03$, t = 1.89, $p < .05$), suggesting partial mediation attributed to the effects of negative health beliefs.

Figure 3
STUDY 2: THE MODERATING INFLUENCE OF SMOKING FREQUENCY ON THE GRAPHICNESS → QUIT THOUGHTS EFFECT FOR YOUNG ADULT SMOKERS



Notes: For young adult smokers, thoughts of quitting were measured at Time 2 (one week after exposure to the graphic warning); graphic level and smoking frequency were both measured at Time 1. The predicted mean score on thoughts of quitting was highest when smoking frequency was low and graphicness was high (4.62, SD = 1.77); at high levels of both smoking frequency and graphicness, the predicted mean score on thoughts of quitting was 4.16 (SD = 1.72). Thus, the positive effect of graphicness on thoughts of quitting is lessened when smoking frequency is higher (vs. lower). The low–low mean score for quit thoughts was 3.72 (SD = 1.84), and the high smoking frequency/low graphicness mean score was 4.04 (SD = 1.73).

Similarities and Differences in Effects Across Studies 1 and 2

The majority of the results between the studies are quite similar despite the cross-sectional versus longitudinal nature of Studies 1 and 2, respectively. Still, as is evident from Table 2 and the "Longitudinal" columns of results in Table 4, there are some differences in path estimates across studies. We conducted statistical difference tests among paths in Studies 1 and 2 using a multigroup model approach. We did so by comparing a multigroup model in which the corresponding path of the two studies was constrained to be equal with a multigroup model in which the paths were freely estimated. As Table 5 shows, only 3 of the 9 hypothesized paths and 3 of the 16 control paths differed across samples. The hypothesized paths that differed were (1) the smoking frequency → negative health beliefs path, which

Table 5
MULTIGROUP CHI-SQUARE DIFFERENCE TESTS: CROSS-SECTIONAL ADOLESCENT SAMPLE STUDY 1 VERSUS LONGITUDINAL YOUNG ADULT SAMPLE STUDY 2

	Chi-Square Difference[a]	*Outcome*
Hypothesized Paths: Initial Model		
H_1: Graphicness → fear	.01	No difference
H_2: Smoking frequency → fear	.00	No difference
H_3: Graphicness → negative health beliefs	1.79	No difference
H_4: Smoking frequency → negative health beliefs	3.61*	Adolescents stronger
H_5: Fear → negative health beliefs	1.46	No difference
H_{6a}: Fear → quit thoughts	5.65**	Adolescents stronger
H_{6b}: Negative health beliefs → quit thoughts	6.21**	Young adults stronger
Hypothesized Paths: Incremental Effects Model		
H_7: Graphicness → quit thoughts	.12	No difference
H_8: Graphicness × smoking frequency → quit thoughts	.84	No difference
Control Paths		
Gender → fear	.90	No difference
Number of friends smoke → fear	.46	No difference
Graphicness × smoking frequency → fear	.31	No difference
Guilt → fear	.61	No difference
Remorse → fear	.81	No difference
Gender → negative health beliefs	4.83**	Young adults stronger
Age → negative health beliefs	1.02	No difference
Adult smoker in household → negative health beliefs	4.85**	Adolescents stronger
Graphicness × smoking frequency → negative health beliefs	.91	No difference
Remorse → negative health beliefs	.67	No difference
Gender → quit thoughts	6.00**	Young adults stronger
Number of friends smoke → quit thoughts	.55	No difference
Smoking frequency → quit thoughts	.02	No difference
Pleasure → quit thoughts	.77	No difference
Smoke socially → quit thoughts	3.43*	Adolescents stronger
Remorse → quit thoughts	.11	No difference

*$p < .10$.
**$p < .05$.
[a]At one degree of freedom.
Notes: Adolescent sample n = 145; young adult sample n = 150.

was marginally stronger in the adolescent sample (β = –.10) than in the young adult sample (β = .03, $\chi^2_{diff.} = 3.61$, $d.f._{diff} = 1$, $p < .10$); (2) the evoked fear → quit thoughts path, which was stronger in the adolescent sample (β = .41) than in the young adult sample (β = .19, $\chi^2_{diff.} = 5.65$, $d.f._{diff.} = 1$, $p < .05$); and (3) the negative health beliefs → quit thoughts path, which was stronger in the young adult sample (β = .57) than in the adolescent sample (β = .19, $\chi^2_{diff.} = 6.21$, $d.f._{diff.} = 1$, $p < .05$).[1]

Finally, although a prime focus of Study 2 was to assess the effects of graphic warnings over time, as previously noted, we did measure all constructs of Study 2 cross-sectionally. The "Cross-Sectional" columns of Table 4 show that these results are quite consistent with the Study 2 longitudinal results. For the hypothesized paths, the key differences were that (1) the fear → quit thoughts path is stronger when both constructs are assessed at Time 1 (β = .40; t = 8.14, $p < .01$) compared with when their assessment is separated by the one-week delay (β = .19; t = 2.41, $p < .05$) and (2) the nonsignificant graphicness → quit thoughts path of the cross-sectional data (β = .02; t = .55, $p > .10$) (relative to the longitudinal data) is likely dominated by the strong fear → quit thoughts relation of the cross-sectional data. The pattern of zero-order correlations among these constructs further bears this out. The fear–quit thoughts correlation for the cross-sectional data (r = .67) is stronger than the fear–quit thoughts correlation for the longitudinal data (r =.49), whereas the graphicness–quit thoughts correlation (r = .42) is the same for both cross-sectional and longitudinal samples. Thus, the temporal proximity of measurement of evoked fear and quit thoughts at Time 1 could have served to strengthen the evoked fear → quit thoughts path.

It is also worthwhile to note that when we compared model paths of Study 1 with the cross-sectional paths of Study 2 (n = 238), there was no difference in strength for the fear → quit thoughts path between adolescents (β = .41; t = 6.89, $p < .01$) and young adults (β = .40; t = 8.41, $p < .01$;

[1]We first constructed a series of measurement invariance models to determine whether the key measurement properties of constructs assessed with multiple items (i.e., graphic level, fear, negative beliefs about smoking, and thoughts of quitting) were similar across samples. To do so, we first developed a model in which loadings to their constructs across groups were freely estimated across groups; we refer to this as the "configural invariance" model ($\chi^2 = 1{,}138.87$, d.f. = 258). This model serves as the baseline against which we compared the next set of models. We then estimated a model that specified the item loadings to their respective constructs as invariant across the two groups—termed the "metric invariance" model ($\chi^2 = 1{,}213.97$, d.f. = 272). The difference in fit between this model and the configural invariance model was significant ($\chi^2_{diff.} = 75.10$, d.f. = 10, $p < .01$), suggesting that not all item loadings to their constructs are invariant. An inspection of the modification indexes revealed that three loadings in the negative health beliefs about smoking measure may not be invariant across group. We relaxed the measurement invariance restriction sequentially for each of the items (highest to lowest modification index) and obtained a "partial metric invariance" model ($\chi^2 = 1{,}158.17$, d.f. = 269) that did not differ in fit from the baseline model ($\chi^2_{diff.} = 19.30$, d.f. = 11, $p > .05$). This evidence of partial metric invariance suggests that the paths can be compared across groups (Steenkamp and Baumgartner 1998).

$\chi^2_{diff.} = .83, p > .10$). Again, the temporal proximity of measurement of evoked fear and quit thoughts at Time 1 may have served to strengthen the evoked fear → quit thoughts path.

GENERAL DISCUSSION AND IMPLICATIONS

Given the dire later-in-life consequences of adolescent and young adult smoking (Surgeon General Report 2012), designing effective antitobacco marketing programs remains an important public health issue. The studies reported in this article addressed several questions of importance to this issue: (1) Will the level of graphicness of visual health warnings on cigarette packages and smoking frequency affect both negative health beliefs and evoked fear related to smoking? (2) Will negative health beliefs and evoked fear influence thoughts of quitting smoking? (3) Will the graphic level of the warnings affect thoughts of quitting beyond the effects of negative health beliefs and evoked fear? and (4) Will this effect be moderated by smoking frequency? The answers to these questions are largely "yes," and the findings are quite similar between studies. These findings point to the robust nature of results for the predicted relationships for these two diverse samples. For six of the nine predicted relationships, and 13 of the 16 control paths, there was not a significant difference between the samples, as Table 5 shows. For example, both graphicness and smoking frequency influenced evoked fear in both samples. Importantly, the incremental effects paths of graphicness → quit thoughts and graphicness × smoking frequency → quit thoughts were found for both samples.

Still, three differences in results between Studies 1 and 2 reveal some interesting insights into the routes by which the graphic visual health warnings affect smokers. First, as we note in Table 5, the smoking frequency → negative health beliefs relationship was marginally stronger for adolescents versus young adults ($\chi^2_{diff.} = 3.61, p < .10$). With less experience, adolescent health beliefs about the risks of smoking may be more malleable and thus have the potential for being affected by smoking frequency ($\beta = -.10$; $t = 1.73, p < .05$). As smoking progresses, they can further develop an unrealistic optimism about cumulative smoking risks (Arnett 2000) and be more likely to discount such risks as a defense mechanism for increased smoking (Eagly and Chaiken 1993). For young adult smokers with greater smoking experience, more resistant beliefs are expected (Petty and Cacioppo 1986; Tormala and Petty 2004). Such entrenchment is likely due to habituation, years of exposure to tobacco warnings, and familiarity with antitobacco messages and warnings. Indeed, as evidenced by young adult smokers' mean scores and variances on negative health beliefs about smoking, our results show that they have entrenched (nonsignificant) and less variable negative health beliefs across smoking frequency levels (lowest smoking frequency: $M = 6.20$, $SD = .93$; highest smoking frequency: $M = 5.75$, $SD = 1.12$; $t = 1.40, p > .10$). However, adolescent smokers displayed significant and more varied negative health beliefs across smoking frequency levels from lowest smoking frequency ($M = 5.73$, $SD = .86$) to highest smoking frequency ($M = 5.12$, $SD = 1.56$; $t = 2.20, p < .05$).

The second and third differences are that the negative health beliefs → quit thoughts path is stronger for young adults than for adolescents, but the fear → quit thoughts relationship is stronger for adolescents than for young adults. Again, young adult smokers have stronger and more crystallized beliefs about the health consequences of smoking that are likely to have strengthened the negative health beliefs → quit thoughts linkage. Because adolescent smokers' health beliefs are less firmly ingrained, this is likely to result in a weaker negative health beliefs → quit thoughts relationship. Still, methodological explanations for differences cannot be ruled out. In Study 1, we measured fear, negative health beliefs, and quit thoughts in a cross-sectional manner, whereas in Study 2 we measured fear at Time 1 and negative health beliefs and quit thoughts at Time 2 (one week later). Thus, the temporal proximity of the measurement of negative health beliefs and quit thoughts at Time 2 could have served to strengthen the negative health beliefs → quit thoughts path of Study 2. In addition, the strong evoked fear → quit thoughts path of Study 1 relative to that of Study 2 could be due to both these constructs being measured cross-sectionally in Study 1 but longitudinally in Study 2.[2]

Implications

Countermarketing programs and segmentation. Two important goals related to graphic visual warning programs are to (1) better understand the different pathways that might drive quit thoughts and (2) design the most effective countermarketing programs to affect smoking cessation. However, not everyone processes such mass countermarketing programs in the same way. The identification of *distinguishable* and *actionable* segments is an important principle in design and application of useful marketing programs (Kotler and Keller 2012) and is found to be true in our study of graphic visual health warnings. In general, persuasion theorists have long been interested in both belief and affective emotion-based responses to advertising (Burke and Edell 1989), but there has been minimal research on how simple package-based warnings may lead to both of these routes to persuasion for different segments. Here, with greater smoking experience, the impact of young adult smokers' health beliefs appears somewhat more similar to the role of fear for adolescent smokers in driving quit thoughts. However, the impact of fear appears stronger for adolescent smokers (see the second footnote), who not only lack smoking experience but also are more impulsive, risk-taking, and prone to sensation seeking—factors that can limit their objective processing (Shiv and Fedorkhin 1999). Thus, these findings extend our knowledge of alternative pathways to persuasion by adolescent versus young adult smokers when exposed to the graphic visual warnings.

We also offer three implications relevant to countermarketing programs. First, for adolescent and young adult

[2]Though not hypothesized, there also is some rationale to suggest that evoked fear may have a stronger effect on thoughts of quitting than negative health beliefs (Witte and Allen 2000). Thus, we used the incremental effects model to test this premise by comparing a model in which the fear → thoughts of quitting and negative health beliefs → thoughts of quitting paths were constrained to be equal with a model in which these two paths were freely estimated. The difference in fit between the constrained and freely estimated models was significant ($\chi^2_{diff.} = 5.72$, $d.f._{diff.} = 1, p < .05$), suggesting that fear had a stronger effect on thoughts of quitting ($\beta = .41$) than did negative health beliefs ($\beta = .19$) for the adolescent sample. With the young adult Study 2 data, we found the opposite. The effect of negative health beliefs on thoughts of quitting ($\beta = .57$) was stronger than the effect of fear on thoughts of quitting ($\beta = .19$; $\chi^2_{diff.} = 4.41$, $d.f._{diff.} = 1, p < .05$).

smokers, it appears that graphic warnings can have an immediate and direct impact on evoked fear as well as a direct and incremental effect on thoughts of quitting. That is, graphicness affects thoughts of quitting through the graphicness → evoked fear → negative health beliefs → thoughts of quitting indirect effect, and graphicness also has an incremental effect through the direct graphicness → thoughts of quitting path. These results support arguments offered by Romer et al. (2013) in that exposure to the graphic warnings can help increase quitting intentions by providing an extra "push" to younger smokers' efforts to quit. Furthermore, for the young adult sample, effects related to both graphicness and fear on thoughts of quitting are evident after a one-week delay following the exposure to the cigarette package warning. Thus, at least in the short run, a substantial weakening of the effect due to time is not present, which has been a common criticism of antismoking campaigns in the past (Andrews 2011). These results suggest that the graphic images may "stay on the mind" of the young adult smoker well after exposure and each time he or she reaches for a cigarette.

Second, higher smoking frequency attenuates the positive effect of the graphic warnings on thoughts of quitting. We believe this finding has an important implication; that is, quit thoughts for those who smoke the most are affected the least by the graphic warnings. This implication suggests that it is important to reach young people in early stages of smoking to maximize the effectiveness of the graphic warning labels. As smoking behavior becomes more entrenched, graphic warning effectiveness diminishes.

Third, for the more experienced young adult smokers, it appears that the negative health beliefs of smoking are an important gateway for thoughts of quitting. Yet, as we noted previously, their higher smoking frequency still serves to reduce the impact of the warnings on quit thoughts. Thus, similar to arguments made in favor of encouraging objective processing of warnings/fear appeals (Leventhal 1970), and in strengthening self-efficacy (Tanner, Hunt, and Eppright 1991), it might be helpful if a *more prominent solution* were readily apparent to young adult smokers. This may involve implementing more visible 1-800-QUIT-NOW numbers (see the Appendix) or Quick Response codes on the package and providing links to social media, websites, and public health agencies (e.g., the CDC) in aiding smoking cessation.

Implications for public health policy. The primary focus of the FDA is to protect public health by ensuring the safety, efficacy, and security of several regulated products, including tobacco (FDA 2013). The Family Smoking Prevention and Tobacco Control Act (2009) instructed the FDA to require and issue colored graphic health warnings on tobacco packages by July 2011, but the industry responded by challenging the mandated warnings on grounds of First Amendment commercial speech rights. With the FDA deciding not to appeal and the Supreme Court declining to hear the appeal of the tobacco companies regarding the Tobacco Control Act (Craver 2013), it seems likely that the FDA will develop (and test) new pictorial warnings it believes will pass the scrutiny of the U.S. Courts and First Amendment rights issues raised by the tobacco companies in the litigation. The FDA has stated that it will "undertake research to support a new rulemaking consistent with the Tobacco Control Act" (Craver 2013; Mientka 2013). The FDA is likely to offer a combination of its own research with recent academic findings (e.g., Wang et al. 2013) as evidence for the better fit of the graphic visual warnings with specific health risks communicated to smokers and potential smokers. Again, our pattern of findings for graphicness would support both direct and indirect links to thoughts of quitting, thus offering some evidence as to the effectiveness of the graphic visual health warnings.

Limitations and Further Research

First, we examined graphic visual warnings for health consequences, such as fatal lung disease, addiction, and harm to others (children). Yet many other themes (e.g., social consequences, resistance and refusal skills, reaction to marketing tactics) can serve as a focus for visual tobacco warnings and other antitobacco efforts (Andrews et al. 2004; Pechmann et al. 2003). Moreover, qualitative and field studies might provide added insight into adolescent and young adult smokers' reactions to graphic visual health warnings. One immediate research question to consider is whether graphic images on cigarette packages act as a deterrent for adolescents and young adults who are not current smokers when they are offered a cigarette. A recent evaluation of those exposed (vs. not exposed) to graphic images from the CDC's "Tips from Former Smokers" antismoking media campaign showed positive effects not only on smoker quit attempts and abstinence but also on nonsmoker recommendations for smokers to quit (McAfee et al. 2013). Thus, clearly, more research examining the potential preventive nature of the graphic warnings is needed.

Second, although we believe that graphicness and its interaction effect with smoking frequency over time are important findings for the young adult sample, the longitudinal nature of the young adult study versus the cross-sectional adolescent study makes the results of Studies 1 and 2 less comparable. Still, and as we report in our first footnote, results for the two studies remained similar for cross-sectional analyses of the young adult sample.

Third, researchers might continue to study other marketing variables (e.g., price, excise taxes, brand minimization; see Weissmann 2012) for their joint effects with the graphic warnings on young smokers. In addition, as "stages of change" models for smoking indicate, beliefs formed during the early stages of smoking (i.e., experimentation) are important for adolescents in acquiring the smoking habit (Leventhal and Cleary 1980). Researchers might explore different belief measures, such as personal beliefs about the risks of smoking that have shown "optimistic biases" on the part of adolescent smokers (Arnett 2000; Slovic 2000). Although our study provides insight into the role of smoking frequency, it may be instructive for future researchers to examine the effects of the graphic visuals throughout all the stages of smoking progression (Prochaska and DiClemente 1983). In addition, we examined one critical affective reaction (i.e., fear), and others as controls (remorse, guilt), but research that specifically addresses other emotions (e.g., disgust, anger, sadness) remains of interest (Morales, Wu, and Fitzsimons 2012). Similarly, the different picture manipulations are complex stimuli that may affect consumers' thoughts and reactions beyond the specific model measures and controls tested here.

Finally, we believe it is important to extend insights into how the graphic visual health warnings affect young smokers for other moderating conditions (e.g., involvement/elaboration) as well as for other smoking products attractive to youth (e.g., flavored cigarillos, e-cigarettes; Tavernise 2013; Yeager and Dennis 2013). It is hoped that such research, combined with our findings, will aid in developing a better understanding of how graphic visual health warnings might serve to address one of the most pressing consumer welfare and public health issues today: That is, preventing adolescents and young adults from becoming lifetime smokers addicted to tobacco.

Appendix

EXAMPLES OF STUDY STIMULI

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WEB APPENDIX

How Graphic Visual Health Warnings Affect Young Smokers' Thoughts of Quitting

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Web Appendix: Survey Measures

Original Control Variables:

What is your gender?

❍ Male

❍ Female

What is your age? ____

How many of your four closest friends smoke cigarettes?

❍ 0

❍ 1

❍ 2

❍ 3

❍ 4

Do you have any brothers or sisters who currently smoke cigarettes?

❍ No

❍ Yes

Is there an adult in your household who is a regular smoker?

❍ No

❍ Yes

Below are some emotions that might be used to describe how the cigarette package made you feel.

	Strongly Disagree						Strongly Agree
Guilty	❍	❍	❍	❍	❍	❍	❍
Angry	❍	❍	❍	❍	❍	❍	❍
Sad	❍	❍	❍	❍	❍	❍	❍
Shameful	❍	❍	❍	❍	❍	❍	❍
Remorseful	❍	❍	❍	❍	❍	❍	❍
Upset	❍	❍	❍	❍	❍	❍	❍
Disgusted	❍	❍	❍	❍	❍	❍	❍

Smoking helps reduce the stress in my life.

Strongly Disagree						Strongly Agree
❍	❍	❍	❍	❍	❍	❍

Smoking cigarettes is pleasurable.

Strongly Disagree						Strongly Agree
❍	❍	❍	❍	❍	❍	❍

When you smoke, do you:

- ❍ Only smoke alone
- ❍ Usually smoke alone
- ❍ Only smoke with other people
- ❍ Usually smoke with other people

Model Variables for Hypothesized Paths:

These next questions are about your reactions to the cigarette package you saw. Please take your time and answer the questions to the best of your ability. Please be honest. There are no right or wrong answers.

The information shown on the cigarette package would help me quit smoking.

Strongly Disagree						Strongly Agree
❍	❍	❍	❍	❍	❍	❍

The information shown on the cigarette package motivates me to quit smoking.

Strongly Disagree						Strongly Agree
❍	❍	❍	❍	❍	❍	❍

How important is it for you to quit smoking?

Strongly Disagree						Strongly Agree
❍	❍	❍	❍	❍	❍	❍

How often do you think about quitting smoking?

Strongly Disagree						Strongly Agree
❍	❍	❍	❍	❍	❍	❍

These next questions are about your general beliefs about smoking. Please take your time and answer the questions to the best of your ability. Please be honest. There are no right or wrong answers.

Smoking is addictive.

Strongly Disagree						Strongly Agree
❍	❍	❍	❍	❍	❍	❍

Nicotine is physically addictive.

Strongly Disagree						Strongly Agree
❍	❍	❍	❍	❍	❍	❍

Secondhand smoke is dangerous to children.

Strongly Disagree						Strongly Agree
❍	❍	❍	❍	❍	❍	❍

Secondhand smoke harms children.

Strongly Disagree						Strongly Agree
❍	❍	❍	❍	❍	❍	❍

Smoking causes lung cancer.

Strongly Disagree						Strongly Agree
❍	❍	❍	❍	❍	❍	❍

Smoking cigarettes increases a person's risk of getting lung cancer.

Strongly Disagree						Strongly Agree
❍	❍	❍	❍	❍	❍	❍

To answer this next set of questions, please think about the cigarette package that you saw at the beginning of this survey.

I think the warning information on the package is...

	1	2	3	4	5	6	7
Not Graphic at all: Very Graphic	❍	❍	❍	❍	❍	❍	❍
Not Vivid at all: Very Vivid	❍	❍	❍	❍	❍	❍	❍
Not Intense at all: Very Intense	❍	❍	❍	❍	❍	❍	❍
Very Weak: Very Powerful	❍	❍	❍	❍	❍	❍	❍

Please indicate how the package made you feel by answering the questions below.

	Strongly Disagree						Strongly Agree
Not Fearful At All: Very Fearful	❍	❍	❍	❍	❍	❍	❍
Not Afraid At All: Very	❍	❍	❍	❍	❍	❍	❍

Afraid Not Nervous At All: Very Nervous	❍	❍	❍	❍	❍	❍	❍
Not Anxious At All: Very Anxious	❍	❍	❍	❍	❍	❍	❍

During the past thirty days, on how many occasions did you smoke cigarettes?

- ❍ 0 days
- ❍ 1 to 2 days
- ❍ 3 to 5 days
- ❍ 6 to 9 days
- ❍ 10 to 19 days
- ❍ 20 to 29 days
- ❍ All 30 days