Antismoking Threat and Efficacy Appeals: Effects on Smoking Cessation Intentions for Smokers with Low and High Readiness to Quit

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Abstract

This study examined the effects of sequencing different types of antismoking threat and efficacy appeals on smoking cessation intentions for smokers with low and high levels of readiness to quit. An experiment was done to test predictions based on Witte's (1992) Extended Parallel Process Model and research by Cho and Salmon (2006). A national probability sample of 555 adult smokers was recruited to take part in this study. Results found a positive two-way interaction effect between message threat and perceived level of message efficacy on intentions to seek help for quitting. A three-way interaction effect was found between message threat, perceived level of message efficacy, and readiness to quit on quitting intentions. Both threat and efficacy were important for smokers with low readiness to quit, whereas efficacy was most important among smokers with high readiness to quit. Implications of the results for antismoking campaigns are discussed along with limitations and future directions.

Recent estimates from the National Cancer Institute (2005) indicate that 21.5 percent (i.e., 23.7% men and 19.4% women) of adults in the United States are current cigarette smokers. Although this reflects a slight decline in smoking rates from previous estimates (e.g., 24.8% men and 20.1% women), the rate of decline has slowed over the last decade and is still far from the Healthy People 2010 target goal of reducing the adult smoking rate to 12 percent. Moreover, cigarette smoking remains the most preventable cause of death in the United States, accounting for about 30 percent (i.e., 440,000) of all deaths in this country each year (NCI, 2005). As a result, federal and state governments, and public health agencies have increased their efforts in implementing programs designed to reduce overall tobacco use. Mass media advertisements (e.g., antismoking ads) are often a central feature of these tobacco control programs because televised antismoking messages are disseminated to smokers proactively, and consequently have a high population penetration rate.

One of the most prevalent appeals found in antismoking advertisements is the fear appeal Cohen, Shumate, & Gold, 2007). Fear appeals are persuasive messages designed to arouse fear by describing the negative consequences that individuals will experience unless they stop risky behaviors and/or enact preventive behaviors (Witte, 1992, 1994). A significant body of research has shown fear appeals to effectively motivate behavior change across a variety of behaviors. Specifically related to smoking cessation, previous research has demonstrated that antismoking ads depicting the serious health consequences of smoking in an emotionally arousing way (e.g., evoking fear) are perceived as effective by both adults and youths (Biener, McCallum-Keeler, & Nyman, 2000; Farrelly, Davis, Haviland, Messeri, & Healton, 2005; Hyland, Wakefield, Higbee, Szczypka, & Cummings, 2006Terry-Mcelrath et al., 2005). Four

separate meta-analyses using different statistical summary strategies reached the general conclusion that fear appeals are most effective at motivating attitude, intention, and behavior change when used in conjunction with high efficacy messages (Boster & Mongeau, 1984; Mongeau, 1998; Sutton, 1982; Witte & Allen, 2000).

When perceptions of efficacy (i.e., beliefs about whether one is able to do the recommended behavior to avert the threat) are taken into account, fear appeal effects on behavioral change are even stronger, as long as perceived efficacy is high (Morman, 2000; Smalec & Klingle, 2000; Stephenson & Witte, 1998; Witte, Berkowitz, Cameron, & Lillie, 1998). Several scholars have proposed different theories to explain the process through which fear appeals motivate behavior change (Hovland, Janis, & Kelly, 1953; Janis, 1967; Leventhal, 1970; Rogers, 1975; Witte, 1992). The current study will focus on Witte's (1992) Extended Parallel Process Model (EPPM)

The EPPM

Witte's (1992, 1994) EPPM combines aspects of both Leventhal's (1970) Parallel Process Model and Roger's (1983) Protection Motivation Theory and explains not only when and why fear appeals are effective, but also when and why they sometimes fail. According to the EPPM, when individuals are exposed to a fear appeals message, two simultaneous message appraisal processes occur: threat appraisal and efficacy appraisal. The threat appraisal involves assessment of the severity of the threat (i.e., how serious are the negative consequences) and susceptibility to the threat (i.e., how likely is it that I will experience these negative consequences). The EPPM stipulates that when both perceptions are high, the emotion of fear is elicited motivating further action. Once fear is experienced, individuals may respond in a productive or counterproductive way depending on their efficacy appraisal.

The assessment of efficacy includes both self-efficacy and response efficacy. Self-efficacy refers to the belief that one is able to perform the recommended behavior in order to avert the threat. Those who have high self-efficacy are more likely to feel that they can exert greater control over a given behavior compared to those who have low self-efficacy (Ozer & Bandura, 1990). On the other hand, response efficacy deals with an individual's perception of the effectiveness of the recommended response to avert the threat. Individuals with high response efficacy beliefs are better able to translate knowledge into behavior (Rimal, 2000).

Based on these two message appraisals, three fear appeal effects are possible according the EPPM: (a) null effect, (b) intended effect (i.e., danger control), and (c) unintended effect (i.e., fear control). When perceived threat and efficacy are low, fear appeals are said to produce null effects on behavior change because individuals do not see a health risk as serious or personally relevant to them, and feel there is little they can do about it. As a result, the appeal is ignored because Witte (1994) argues that messages which fail to produce at least moderate threat will not motivate a person to consider efficacy information. When perceived threat is high, fear appeals may either facilitate positive or negative behavior change, depending on the assessment of efficacy. The EPPM states that if perceived efficacy is high, danger control (i.e., adaptive) responses will be the dominant method used by individuals to reduce their feelings of fear (Witte, 1994; Witte et al., 1998). The focus will be on alleviating the threat via enactment of the recommended coping behavior. Conversely, if perceived efficacy is low, the individual will employ fear control (i.e., maladaptive) responses. The focus will be on alleviating the fear, but doing nothing about the threat via enactment of defensive avoidance, or denial of the threat (Witte et al., 1998).

Numerous studies have tested for the effects of threat and efficacy appeals on behavioral intentions and behavior change (for review, see Witte & Allen, 2000). Related to antismoking appeals, message themes related to risk, including seriousness of health risks and self-efficacy

are considered critical media campaign components (Chew, Palmer, Slonska, & Subbish, 2003). Overall, high threat, high efficacy messages generally produce the most positive impact on behaviors while low threat, low efficacy messages produce the least positive impact on behaviors (Witte & Allen, 2000). Moreover, it has been argued that there is an interaction effect between threat and efficacy on behaviors, such that the effect of threat on behaviors is positive only when efficacy is high, otherwise, threat will likely have a null or unintended effect (Witte, 1992, 1994).

Limitation of Fear Appeal and Antismoking Evaluation Studies

Although there is good support for the EPPM overall, one limitation to fear appeal studies done so far is the use of primarily text-based messages to manipulate threat and efficacy. This limitation has implications particularly for fear appeals research involving broadcast media messages such as health-oriented public service advertisements (PSAs). Health-oriented PSAs typically present the negative consequences of unhealthy behaviors (e.g., smoking, drug use, drinking and driving) textually, verbally, and/or visually to motivate behavior change. And so, it may be somewhat inappropriate to generalize the effects obtained for text-based fear appeal studies to situations involving video-based messages, where often the message presented includes visual and/or verbal elements as well.

Additionally, anti-smoking PSAs may be categorized as threat-based appeals (e.g., smoking causes cancer) that focus on the negative health/social consequences of smoking or efficacy-based appeals (e.g., calling a quitline can help you quit) that promote the use of various cessation aids/services (Beaudoin, 2002; Cohen et al. 2007). Typically, studies examining the effectiveness of antismoking PSAs focus their attention on evaluation of threat-based appeals. Less empirical work has been done to examine the effects of smoking cessation appeals on behaviors (Wakefield & Durrant, 2006). This is an important area to explore because it has been suggested that certain smoking cessation ads (e.g., pharmaceutical ads for nicotine replacement products) may produce boomerang effects (i.e., lead smokers to have weak intentions to quit) by giving smokers a false sense of security that it is easy to quit and underestimate the severity of smoking addiction (Wakefield & Durrant, 2006). Only one published study has tested this idea and examined the effects messages about smoking cessation products have on smoking-related risk perceptions and quitting intentions (Bolton, Cohen, & Bloom, 2006). Participants in this study were exposed either to a message about a nicotine replacement product (remedy message) or one that provided information on how to quit smoking unaided (no-remedy message). Following message exposure, participants completed measures assessing smoking-related risk perceptions and quitting intentions for both themselves and a hypothetical smoker. Bolton et al. (2006) found that quitting intentions and risk perceptions decreased with smoking status (ranging from non-smoker to regular smoker) after exposure to the remedy message. Based on this result, Bolton et al. (2006) concluded that messages about nicotine replacement products may reduce risk perceptions and quitting intentions among regular smokers.

Lastly, previous research on evaluation of antismoking appeals has largely focused on those directed at adolescents (Biener, 2000; McKenna, Gutierrez, & McCall, 2000; Pechmann and Goldberg, 1998; Pechmann & Riebling, 2000; Siegel & Biener, 2000; Wakefield et al., 2003). Comparatively less work has been done to examine appeals directed at adults to identify what strategies are effective and ineffective for promoting smoking cessation.

This study hopes to address the aforementioned limitations by using television ads as threat and efficacy stimuli to see if EPPM predictions hold for video-based messages (which incorporate text, verbal, and visual elements). This is one of the first studies to use video-based messages for both threat and efficacy appeals. By using television ads for communicating threat and efficacy information, and sequencing them so that threat precedes efficacy, we can test the

EPPM in an important context. Based on the EPPM (Witte, 1992, 1994), a positive interaction effect is expected between message threat and message efficacy on smoking cessation intentions.

> H1a: When message threat is low, smoking cessation intent is low regardless of message efficacy.

> H1b: When message threat is high, smoking cessation intent is greater for those perceiving high message efficacy than those perceiving low message efficacy.

Recently it has been argued that fear appeal effects are not consistent for everyone, and differ depending on certain individual characteristics, such as a person's stage of change for a particular behavior (Cho & Salmon, 2006).

Stages of Change and Fear Appeal Effects

The Stages of Change Model (Prochaska & DiClemente, 1983) describes the process individuals go through to enact a given behavior such as smoking cessation. The two major components of the model are stages of change and decisional balance (Prochaska DiClemente, & Norcross, 2002). Specifically, there are five stages individuals go through in ascending order: (a) pre-contemplation, (b) contemplation, (c) preparation, (d) action, and (e) maintenance (Prochaska & DiClemente, 1983). Decisional balance refers to the weighing of perceived costs and benefits for a behavior and influences the extent to which individuals move through the five stages of change (Prochaska & DiClemente, 1983). According to Prochaska and his colleagues (Prochaska, DiClemente, & Norcross, 1992; Prochaska, Redding, & Evers, 2002), behavior change is a long-term process involving multiple discrete stages, and individuals' needs differ at each stage.

Fear appeal effects may differ for those in early (e.g., pre-contemplation) and later stages (e.g., contemplation) of behavior change. Specifically, Maibach and Cotton (1995) argue that fear appeal messages can facilitate positive stage changes (i.e., progression from early to later stages), inhibit or delay stage changes from occurring, or facilitate negative stage changes (i.e., regression from a later stage to an earlier stage). Studies using the model have found that individuals' perceived self-efficacy increases as they move from early to later stages of change (e.g., Goreley & Gordon, 1995; Marcus, Eaton, Rossi, & Harlow, 1994). Similarly, it has been argued that individuals' perceived response efficacy also increases as they move from early to later stages of change (e.g., Cho & Salmon, 2006). In EPPM terms, this suggested that individuals at early stages of change would respond to high threat fear appeals messages by engaging in fear control, whereas those in later stages of change would enact danger control.

Recently, Cho and Salmon (2006) tested the idea of using stages of change as a moderator of the effects of high/low threat fear appeals on behavioral intentions and behaviors. Participants in early (pre-contemplation), moderate (contemplation, preparation), or late stages of change (action, maintenance) for regular sunscreen use were exposed to either a high or low threat message about skin cancer. Overall, the results show that those in early stages of change reported more defensive avoidance, fatalism, less favorable attitudes, and weaker intentions to perform the recommended behavior after exposure to a high threat message than those in later stages (Cho & Salmon, 2006). This study provided some initial evidence for stages of change as a moderator of fear appeal effects on behavioral intentions, but there were some limitations worth noting. First, Cho and Salmon (2006) only exposed participants to threat appeals and efficacy beliefs were not measured. Hence, the interaction effect between threat and efficacy on behavioral intentions could not be tested. Second, Cho and Salmon (2006) used a text-based threat manipulation for their study. As discussed, this limits the extent to which the results can be generalized to other forms of fear appeal messages that are communicated visually and/or

verbally. Lastly, the study failed to find support for an interaction effect between threat and stages of change (Cho & Salmon, 2006).

This study extends the work by Cho and Salmon (2006) in examining the main and interaction effects of antismoking threat and efficacy appeals on smoking cessation intentions for adult smokers with either low readiness to quit (i.e., at an early stage of change) or high readiness to quit (i.e., at a later stage of change). Based on the arguments of Cho and Salmon (2006), it is assumed that smokers with low readiness to quit will likely possess weak efficacy beliefs about quitting smoking, and have little motivation to quit. For these individuals, smoking cessation intentions will be high only if the anti-smoking ads evoke feelings of high threat and high efficacy. Alternatively, smokers with high readiness to quit are assumed to have strong efficacy beliefs about quitting, and also have strong motivations to quit. For these individuals, smoking cessation intentions will be high if antismoking ads evoke feelings of either high threat or high efficacy. Formally stated, the following hypotheses are posited:

> H2a: For smokers with low readiness to quit, smoking cessation intentions is high only when both message threat and message efficacy are high, otherwise it is low.

> H2b: For smokers with high readiness to quit, smoking cessation intentions varies as a direct function of message threat and message efficacy, with efficacy having a stronger effect than threat.

Method

Participants and Study Design

A total of 555 adult smokers aged 18-87 (M=55.17 years, s.d.=11.63) were recruited to participate in this study through Knowledge Networks, a survey research company which has developed a nationally representative panel of adults in the United States. Participants for the panel are recruited through random digit dialing (RDD) procedures and provided internet access, if necessary. Once the sample is selected from the panel, data are gathered online. The current sample consisted of 295 males (53.2%) and 260 females (46.8%), with 15.1% having a bachelor's degree or higher, 41.6% having had some college, 34.4% completing high school, and 8.8% having less than a high school education. Approximately 85% of the participants were White, 6.3% African-American, 4.5% Hispanic, 2.2% Mixed, and 2.3% marked "other." To ensure that all the participants were current regular smokers, they were asked to respond to three screening questions asking about their smoking behaviors. The inclusion criteria were that the participant: (a) had to smoke cigarettes currently, (b) had smoked an average of 5 or more cigarettes a day in the past week, and (c) had smoked more than 100 cigarettes in their lifetime. Participants who failed to meet all three criteria were excluded from the study. A breakdown of the demographic variables is presented in Table 1.

To test the proposed hypotheses, an experiment was conducted pairing different antismoking threat and efficacy appeals to see their effects on smoking cessation intentions. Threat was manipulated in two levels (low/high) using antismoking PSAs. Efficacy was manipulated in two ways to reflect different smoking cessation aids for helping smokers quit (nicotine replacement product ad/quitline ad). Participants' stage of change was assessed prior to exposure to the ads, along with a series of other smoking-related variables (e.g., nicotine addiction, smoking history, perceived vulnerability to the consequences of smoking, perceived benefits of quitting, and number of past quit attempts). The main dependent variables of interest in this study were intentions to quit and intentions to seek help for smoking cessation, Three items assessed the evaluation of the ads in terms of perceived message threat, perceived message efficacy, and perceived exaggeration and manipulation of the ad.

Stimulus Advertisements and Message Selection

For this study, two types of antismoking ads were used, those that are threat-based and those that are efficacy-based (i.e., cessation ads). Threat-based appeals focused on the negative social or health consequences of smoking, designed to incite either the "fear of social rejection" or the "fear of disease and/or death" to motivate smokers to quit. Efficacy-based appeals focused on providing smokers with coping information for how to quit smoking (i.e., calling a quitline to get useful tips for quitting or using a nicotine replacement product). In selecting the stimulus ads for this study, care was taken to choose ads to reflect those likely used in the real world.

For threat-based appeals, low and high threat ads were carefully selected from a pool of 32 ads previously evaluated by a group of adult smokers from a national probability sample. The ads were taken from an archive of antismoking ads from the Centers for Disease Control (CDC). All of these ads targeted adults, lasted 30 seconds, and were broadcasted in English. An earlier study was conducted with 312 smokers, aged 19-86 (M=53.20 years, s.d.=12.22), reporting on their emotional responses to a set of 32 antismoking ads, with one of the emotions assessed being fear. Specifically, participants were asked to what extent they agreed with the statement, "While watching the ad, I felt afraid" from (1) strongly disagree to (5) strongly agree. Participants for this evaluation study were primarily male (52.2%) and White (82.2%), with 15.3% having a bachelor's degree or higher, 33.1% having had some college, 37.9% completing high school, and 13.7% with less than a high school education. Based on that study's findings, the two low threat ads selected for this study had mean fear scores of 2.08 (s.d.=.72) and 1.87 (s.d.=.80) out of 5, with five representing feelings of high threat. The two high threat ads selected for this study had fear scores of 3.15 (s.d.=1.19) and 3.11 (s.d.=1.02) out of 5. All of the means were significantly different from the mid-point of the scale. A t-test comparing the low threat and high threat ads on reported fear scores yielded a significant difference between the two groups of ads, t(198)=8.50, p<.001. Moreover, the selected ads were partially controlled for other ad characteristics (e.g., message sensation value, visual-verbal redundancy). The two high threat ads selected vividly portrayed the negative health consequences of smoking, making the argument that every cigarette smoked causes damage to the brain and lungs respectively, leading to blindness, stroke, cancer, and death. The two low threat ads selected focused on the negative social consequences of smoking, that people don't want to be around smokers because it is unattractive and socially disapproved.

For efficacy-based (i.e., cessation aid) appeals, as mentioned, two different types were selected to reflect different smoking cessation aids promoted to encourage smokers to quit. One ad was a commercial for the *Commit* nicotine lozenge (i.e., a NRP). The other ad was taken from a series of ads produced by the Centers for Disease Control (i.e., Chuck quits smoking) designed to promote the use of a quitline to get useful tips for quitting. Specifically, the ad selected begins by presenting the text, "Chuck. He quit smoking," then shows Chuck talking about the different tips he received from the smoker's helpline to deal with cravings after quitting (e.g., eating an apple, taking a nap, taking a walk). The ad ends with Chuck experiencing a craving and deciding to take a walk to deal with it. Both ads were previously aired on television. Based on work by Wakefield and Durrant (2006), it was expected that in terms of efficacy, the NRP ad would make smokers feel that it is easier to quit smoking than the quitline ad. It is important to point out that their results were based on a sample of adolescents who were experimental smokers or non-smokers, and so may not generalize to the present sample.

Procedures

Once screened for eligibility, participants responded to the set of smoking-related questions and the stages of change measure. Next, they were randomly assigned to one of five experimental conditions, where they either viewed: (a) two high threat antismoking ads followed by a nicotine replacement product (NRP) ad (*n*=105); (b) two high threat antismoking

ads followed by a Quitline ad (*n*=105); (c) two low threat antismoking ads followed by a NRP ad (*n*=108); (d) two low threat antismoking ads followed by a Quitline ad (*n*=119); or (e) two high threat antismoking ads only (*n*=118). Participants viewed the set of ads only once to simulate the real viewing of advertisements as closely as possible. After watching the set of ads, they responded to the set of outcome and ad evaluation measures.

Measures

Smoking-Related Questions

Nicotine dependence—Participants' level of nicotine dependence was measured using the Fagerstrom Test for Nicotine Dependence (FTND) (Heatherton, Kozlowski, Frecker, & Fagerstrom, 1991). The FTND has six items assessing: (a) Number of cigarettes smoked per day, scored from (0) 10 or fewer to (3) 31 or more, (b) the time of the first cigarette after waking, scored from (0) more than 60 minutes to (3) less than 5 minutes, (c) smoking or not smoking in case of illness (0=no, 1=yes), (d) ability to refrain from smoking in non-smoking place (0=no, 1=yes), (e) reporting or not reporting the first cigarette of the day as the most difficult to give up (0=no, 1=yes), and (f) smoking or not smoking more heavily in the morning (0=no, 1=yes). An FTND score of 6 out or higher out of 10 identifies participants with high nicotine dependence.

Perceived vulnerability to smoking harms—Two items assessed the extent to which participants felt they were susceptible to health threats because of their smoking. Specifically, they were asked, "how much do you think you can smoke without harming your health" and "to what extent do you feel your overall health has been affected by smoking." Both items were scored on a 5-point scale and averaged into an index, with (1) reflecting low vulnerability and (5) reflecting high vulnerability.

Perceived benefit of quitting smoking—A single item assessed the extent to which participants felt that quitting smoking could help their health, rated on a 5-point scale from (1) not at all to (5) very much.

Smoking history and previous quit attempts—Participants were asked how old they were when they smoked their first whole cigarette. This response was then subtracted from their current age to get an estimate of the number of years the participant had been smoking. They were also asked how many times they have previously quit smoking on purpose for more than one complete day.

Readiness to quit smoking—Participants' level of readiness to quit smoking was measured using a modified version of the Ladder of Contemplation (Biener & Abrams, 1991). The 11-point ladder is anchored at (0) I have no thoughts about quitting smoking to (10) I am taking action to quit smoking. The different statements on the contemplation ladder reflects the different stages of change described by Prochaska & DiClemente (1983) and provides a continuous measure of stages of change for smoking cessation. It has been validated as a measure of smokers' level of motivation to quit smoking (Biener & Abrams, 1991) and has been used in numerous studies to predict smoking cessation (e.g., Abrams, Herzog, Emmons, & Linnan, 2000; Bernstein & Cannata, 2006; Martin, Rohsenow, MacKinnon, Abrams, & Monti, 2006).

Smoking Cessation Intentions

Intentions to quit smoking—Three items assessed participants' intent to quit smoking in the next three months. Specifically, they were asked, "How likely is it that in the next 3 months you will" (a) quit smoking completely and permanently, (b) reduce the number of cigarettes

you smoke in a day, and (c) talk to someone (friend, family member, spouse) about quitting smoking. The items were scored on a 4-point scale from (1) definitely will not to (4) definitely will, and averaged into an index. The items yielded a good reliability score (α=.84).

Intentions to seek help for smoking cessation—Two items assessed participants' intent to seek help for smoking cessation in the next three months. Specifically, they were asked, "How likely is it that in the next 3 months you will" (a) seek counseling/support to help you quit smoking, and (b) enroll in a smoking cessation program if one were available to you at minimal cost and easy access. The two items were highly correlated (r=.83) and averaged into an index. A summary of the means and standard deviations for all of the aforementioned variables are presented in Table 2.

Ad Evaluations

Perceived message threat—Three items assessed the extent to which the ads made participants feel threatened because of their smoking. Specifically, the items asked "Overall, how much did the ads make you" (a) worry about your health risks because of your smoking, (b) think about the serious health effects of smoking, and (c) feel afraid or fearful about your smoking. The items were averaged to create an index, and had a high reliability score (α=.94).

Perceived message efficacy—A single item assessed the extent to which the ads made participants feel efficacious about quitting smoking. The item asked, "Overall, how much did the ads make you feel that it is easy to quit smoking." This item was previously used by Wakefield and Durrant (2006) in their study to assess perceived level of message efficacy for antismoking efficacy ads.

Perceived exaggeration and manipulation of the ad—Two items assessed the extent to which participants felt the information presented in the ads about smoking: (a) was exaggerated, and (b) tried to manipulate your feelings. The two items were only moderately correlated (r=.47) and so only the first item was kept (i.e., information in the ads about smoking was exaggerated).

Results

Data Analysis Strategy

Prior to testing the proposed hypotheses, manipulation checks were done to see if the ads were successful at evoking the appropriate level of threat (low/high) and efficacy (low/high). Two sets of analyses were then performed on the data set: (a) test of the predicted two-way (threat × efficacy) interaction effect on intent to quit and seek help for cessation based on Witte's (1992) EPPM and (b) test of the three-way (threat × efficacy × readiness to quit) interaction effects on intent to quit and seek help for cessation proposed by Cho and Salmon's (2006) study.

Manipulation and Confound Checks

Message threat—An ANOVA was done with perceived message threat as the dependent variable and condition as the independent factor. The overall model was significant, $F(4, 550)$ =10.94, $p<.001$, partial η^2=.07. As expected, the three high ad threat conditions (M=2.63, M=2.60, M=2.60) yielded significantly higher scores for perceived message threat compared to the two low ad threat conditions (M=2.09, M=2.10). Hence, the threat manipulation worked.

Message efficacy—An ANOVA was performed with perceived message efficacy as the dependent variable and condition as the independent factor. The overall model was significant, $F(4, 550)$=2.72, $p<.05$, partial η^2=.02. The only significant difference was between the high

threat plus NRP ad condition and the high threat only condition (p<.05). All other conditions did not significantly differ in perceived message efficacy. Table 3 summarizes perceived message threat and message efficacy by experimental conditions. Aggregating across the two NRP ad and Quitline ad conditions allowed for comparison of three efficacy conditions (NRP, Quitline, no efficacy) in terms of perceived message efficacy. No significant differences were found in level of perceived message efficacy between the NRP ad conditions (*M*=1.70) and the Quitline ad conditions (*M*=1.63). The no efficacy ad condition (*M*=1.42) was not significantly different from the Quitline ad conditions, but was significantly different from the NRP ad conditions. Hence, the efficacy manipulation failed.

Given that the two efficacy (NRT/Quitline) ad conditions did not significantly differ in level of message efficacy, it was not possible to test either the threat × efficacy interaction or the threat × efficacy × readiness to quit interaction using the efficacy manipulation (i.e., high/low) as one of the predictors. As an alternative, the continuous variable of *perceived message efficacy* was used instead to serve as the efficacy predictor. A median split was done on perceived message efficacy to create the low message efficacy and high message efficacy groups. Unlike the other two predictor variables (i.e., message threat and readiness to quit), perceived message efficacy was not an exogenous variable. This posed a possible confound problem in that random assignment was no longer applicable to the data set. Whereas the two levels of message threat (i.e., high and low) were based on the threat manipulations, the two levels of message efficacy were created *afterwards* based on participants' post-hoc evaluations of the efficacy manipulations.

Therefore, while message efficacy was manipulated to be high or low apriori based on the type of appeal used (NRT product/Quitline), the measure of *perceived message efficacy* was based on post-hoc evaluations of message efficacy across both types of efficacy appeals. As a result, it was uncertain whether or not individuals who evaluated the efficacy ads post-hoc as low or high in level of message efficacy differed in their characteristics. A t-test of differences in demographics and smoking-related characteristics (e.g., nicotine dependence) between the high and low perceived message efficacy groups yielded significant differences in age, smoking history, nicotine dependence, and perceived benefits of quitting. These variables were entered into the first block as controls in all analyses testing interaction effects between message threat and perceived message efficacy.

Tests of Interaction Effects

To test hypotheses one and two, multiple linear regressions were conducted, with smoking cessation intentions (i.e., intent to quit smoking, intent to seek help for quitting smoking) as the dependent measures. The following set of variables served as controls and entered into the first block: age, smoking history, nicotine dependence, and perceived benefits from quitting. Message threat and perceived message efficacy were the main predictors (for H1), along with readiness to quit (for H2). These were entered into the second block of the model. Lastly, the appropriate interaction term (i.e., threat × efficacy for test of H1, and threat × efficacy × readiness to quit for test of H2) was entered into the last block of the regression model. All of the predictor variables were centered so as to avoid potential problems with collinearity.

Hypothesis one—The first hypothesis predicted a positive two-way interaction effect between message threat and message efficacy on smoking cessation intentions. For intent to quit smoking, no significant interaction effect was found between message threat and perceived level of message efficacy controlling for possible confounds, β=.04, t=1.06, p=.29. For intent to seek help for quitting, a significant positive interaction effect was found between message threat and perceived level of message efficacy, controlling for potential confounds, β=.11, t=2.35, p<.05, partial r=.11. Overall, the model accounted for 13 percent of the variance in

intentions to seek help, R^2=.13, $F(7, 420)$=9.14, p<.001. A plot of this interaction effect is shown in Figure 1.

Based on the EPPM, it was expected that when message threat was low, smoking cessation intentions would not differ as a function of perceived level of message efficacy. As predicted, a t-test reveals that when message threat was low, those who perceived high levels of message efficacy (M=1.68, $s.d.$=.64) did not report significantly greater intentions to seek help for quitting than those who perceived low levels of message efficacy (M=1.62, $s.d.$=.70), $t(204)$= −.63, p=.53. It was also expected that when message threat was high, smoking cessation intentions would be greater for those with high levels of perceived message efficacy than those with low levels of perceived message efficacy. As expected, a t-test shows that when perceived message threat was high, those who perceived high levels of message efficacy (M=2.27, $s.d.$=.82) did report greater intentions to seek help for quitting than those who perceived low levels of message efficacy (M=1.61, $s.d.$=.68), $t(162)$=−5.55, p<.001. H1 was partially supported.

Hypothesis two—The second hypothesis predicted a three-way interaction effect between message threat, message efficacy, and readiness to quit. For intent to quit smoking, this hypothesized three-way interaction effect was found controlling for possible confounds, β=−. 09, t=−2.03, p<.05, partial r=−.10. The overall model accounted for 47 percent of the variance in intentions to quit smoking, R^2=.47, $F(8, 419)$=46.47, p<.001. However, for intent to seek help for quitting smoking, no significant three-way interaction effect was found between message threat, perceived level of message efficacy, and readiness to quit controlling for possible confounders, β=−.01, t=−.15, p=.88. Overall, H2 was partially supported.

To tease out the nature of the three-way interaction effect found for intentions to quit smoking, separate two-way interaction tests (i.e., ad threat × ad efficacy) were done for smokers with a low readiness to quit, and those with a high readiness to quit. Based on the arguments by Cho and Salmon (2006), it was expected that for smokers with a low readiness to quit, a positive two-way interaction effect would be found. Consistent with this expectation, a positive interaction effect was found between message threat and perceived levels of message efficacy on intention to quit smoking, controlling for possible confounders, β=.13 t=2.38, p<.05, partial r=.14. The model accounted for 29% of the variance in intentions to quit smoking for this group of smokers, R^2=.29, $F(7, 267)$=15.41, p<.001. A plot of this interaction is shown in Figure 2.

Specifically, when message threat was low, smokers with a low readiness to quit and perceived high levels of message efficacy did not significantly differ in their intentions to quit smoking (M=2.01, $s.d.$=.65) than those who perceived low levels of message efficacy (M=1.90, $s.d.$=. 60), $t(148)$=−1.03, p<.001. When message threat was high, smokers who had a low readiness to quit and high levels of perceived message efficacy scores reported significantly greater intentions to quit smoking (M=2.72, $s.d.$=.62) than those with low levels of perceived message efficacy (M=2.25, $s.d.$=.58), $t(127)$=−4.44, p<.001.

For smokers with a high readiness to quit, based on the arguments proposed by Cho and Salmon (2006), it was expected that intentions to quit would vary as a direct function of both message threat and perceived levels of message efficacy (i.e., main effects model). As predicted, both message threat (β=.22, t=2.92, p<.01, partial r=.24) and perceived levels of message efficacy (β=.41, t=5.53, p<.01, partial r=.42) independently predicted intentions to quit smoking, controlling for possible confounds. The overall main effects model accounted for 25 percent of the variance in intentions to quit for this group of smokers, R^2=.25, $F(7, 145)$=7.03, p<.001. A plot of the effects for message threat and perceived message efficacy is shown in Figure 3.

A comparison of the standardized beta weights show that perceived level of message efficacy had a stronger impact on intent to quit than message threat for this group of smokers.

Discussion

The purpose of this study was twofold: (a) to test for the predicted two-way interaction effect between message threat and message efficacy on smoking cessation intentions based on the EPPM, and (c) to test for a possible three-way interaction effect between message threat, message efficacy, and readiness to quit (i.e., stages of change) on smoking cessation intentions, extending from the work of Cho and Salmon (2006).

In the test of the EPPM predictions, there was only partial support found for the interaction effect between message threat and perceived message efficacy on smoking cessation intentions. Of the two intention outcomes explored, the effect was found for intent to seek help for quitting, but not intent to quit smoking. Although the results provide partial support of the EPPM, this is of one the first tests of the theoretical model using video-based threat and efficacy appeals. Previous studies were limited in that the model was tested using primarily text-based appeals. Consistent with the EPPM, smokers who perceived high message threat and high message efficacy had the strongest intentions to seek help for quitting smoking, whereas intent was low for those with either low message threat and/or message efficacy perceptions.

Extending on the EPPM, Cho and Salmon (2006) argued that fear appeal effects would differ for individuals at different stages of change. In this study, stage of change was conceptualized as a smoker's level of readiness to quit smoking. A three-way interaction effect was found between message threat, perceived level of message efficacy, and readiness to quit on intentions to quit such that for those with low readiness to quit, both high message threat and high levels of message efficacy were necessary to motivate intentions to quit. Alternatively, for smokers with a high readiness to quit, either high message threat or high levels of message efficacy was sufficient to motivate intentions to quit. These results are consistent with Cho and Salmon's (2006) assertion that those in early stages of change (i.e., low readiness to quit) likely possess weaker efficacy beliefs about quitting than those in later stages of change (i.e., high readiness to quit). For those smokers who are not yet ready to quit, they require both the motivation and confidence to quit. Exposing them to high threat antismoking messages as well as high efficacy cessation appeals would satisfy both of these requirements. On the other hand, for smokers who are highly motivated to quit, they require primarily the confidence to act on their motivations. And so, for these individuals, exposure to information that increases their perceptions of efficacy about quitting would be the key to reinforcing their commitment to quitting. Perceived message efficacy was found to be more predictive than message threat on quitting intentions among this subgroup of highly motivated smokers.

Practical Implications

The results of this study have several important implications for designers of health campaigns aimed at promoting greater smoking cessation among adults. First, both high threat-oriented and high efficacy-oriented information need to be present for smoking cessation messages to be most effective at motivating quitting. Future studies will need to explore whether sequencing of the two types of information matter (e.g., does threat necessarily have to precede efficacy), and to identify the maximum allowable lag time between presentation of threat and efficacy information before the effects begin to taper off. Ideally, it may be best to sequence efficacy ads right after threat-based messages. However, this is likely impractical and the "take home message" is to be sure to have strong efficacy information (whatever the type or source) in close proximity to the threat information.

Second, smokers' level of readiness to quit may serve as an effective way to segment the audience for future antismoking campaigns. Specifically, the results of this study show that the effectiveness of antismoking threat and efficacy appeals differ for those with low and high readiness to quit smoking. Tailoring messages to focus either on increasing motivation and/or confidence to quit smoking in line with the smoker's level of readiness to quit would be an important strategy for improving the effectiveness of fear appeals. Particularly for those smokers with a high readiness to quit, increasing their efficacy perceptions about quitting is critical.

Lastly, antismoking campaigns should continue to use emotionally evocative messages to motivate smokers to quit by reminding them of the serious health threats they and/or their loved ones could experience as a result of their smoking behaviors. The present study provides evidence that fear appeals continue to be an effective message tactic for motivating smokers to quit smoking. It is important to point out that the two high threat ads used in this study both contained strong arguments for why smokers should quit. Health message designers should pretest their antismoking messages carefully to make sure that they contain high quality arguments (i.e., those perceived to be convincing and persuasive). Threatening messages low in argument quality may be less effective at motivating smokers to quit, and could provoke reactance-type responses (e.g., defensive avoidance, denial of the threat, and other forms of biased processing) among smokers. Although the results of this study have some important implications for antismoking campaigns, there were several limitations worth discussing.

Limitations and Suggestions for Future Research

One main limitation of this study is the use of a self-selected sample of smokers. Participants who agreed to take part in this study may have a stronger readiness to quit smoking (even among those in the low readiness to quit group) than those who chose not to participate. Also, smokers were asked to carefully attend to the antismoking threat and efficacy ads shown to them so that they could respond to questions about the ads afterwards. Exposure to threat and efficacy appeal messages was required, a condition that cannot be guaranteed in the field. Although participants viewed the ads outside of a lab, they were also not seeing the ads as part of their everyday television watching limiting ecological validity.

Another limitation of this study is that the neither the NRP or Quitline ad were perceived as highly efficacious (i.e., both had ad efficacy means below 2 on a 4-point scale with higher scores reflecting greater ad efficacy). In terms of testing the EPPM, this study provided only an indirect test because there was no true "high efficacy" condition. Despite this limitation, evidence consistent with EPPM predictions was found and so it is expected that the effects would be enhanced with a stronger efficacy manipulation. It is interesting to see that smokers did not perceive either of the efficacy ads as highly efficacious because both ads are representative of those currently shown on television. It is important then to focus greater research efforts on developing more effective ways to frame efficacy information about quitting smoking so that smokers feel more confident in their ability to quit successfully.

A third limitation of this study was that only proximal (i.e., immediate) effects were examined. Smokers were immediately shown the NRT/Quitline ad after exposure to the two high threat or low threat antismoking ads. In the natural mass media environment, it is unlikely that antismoking threat ads immediately precede antismoking efficacy ads. In fact, the practice of many public health communication campaigns is to use "flighting" for threat-oriented and cessation ads making it necessary to test for distal or lag effects of these appeals on smoking cessation behaviors in future studies to determine whether or not they work with a "distraction" (e.g., within the context of a show) embedded in between the two types of appeals.

A final limitation is that this study assessed only participants' smoking cessation intentions but not their actual quitting behaviors. It is important to determine whether intentions to quit or seek help for quitting are translated into smoking cessation behaviors. In a recent meta-analysis of the relationship between intentions and behaviors, it was reported that for experimental studies, a medium-to-large change in intentions (i.e., effect size of .66) leads to a small-to-medium change in behavior (i.e., effect size of .36) and so changes in intentions does have a significant impact on subsequent behaviors (Webb & Sheeran, 2006). Nevertheless, it is important to do a follow-up study to determine whether or not smokers acted on their reported intentions to quit or seek help for quitting.

References

Abrams DB, Herzog TA, Emmons KM, Linnan L. Stages of change versus addiction: A replication and extension. Nicotine & Tobacco Research 2000;2(3):223–229. [PubMed: 11082822]

Bernstein SL, Cannata M. Nicotine dependence, motivation to quit, and diagnosis in emergency department patients who smoke. Addictive Behaviors 2006;31(2):288–297. [PubMed: 15993546]

Biener L. Adult and youth response to the Massachusetts anti-tobacco television campaign. Journal of Public Health Management and Practice 2000;6:40–44. [PubMed: 10848481]

Biener L, Abrams DB. The contemplation ladder: Validation of a measure of readiness to consider smoking cessation. Health Psychology 1991;10:360–365. [PubMed: 1935872]

Biener L, McCallum-Keeler G, Nyman AL. Adults' response to Massachusetts anti-tobacco television advertisements: impact of viewer and advertisement characteristics. Tobacco Control 2000;9:401–407. [PubMed: 11106710]

Bolton LE, Bloom PN, Cohen JB. Does marketing products as remedies create 'get out of jail free' cards? Journal of Consumer Research 2006;33:71–81.

Boster, FJ.; Mongeau, P. Fear-arousing persuasive messages. In: Bostrom, RN.; Westley, BH., editors. Communication yearbook. Vol. 8. Sage; Newbury Park, CA: 1984. p. 330-375.

Chew F, Palmer S, Slonska Z, Subbiah K. Enhancing health knowledge, health beliefs, and health behavior in Poland through a health promoting television program series. Journal of Health Communication 2003;7:179–196. [PubMed: 12166872]

Cho H, Salmon CT. Fear appeals for individuals in different stages of change: Intended and unintended effects and implications on public health campaigns. Health Communication 2006;20(1):91–99. [PubMed: 16813492]

Cohen EL, Shumate MD, Gold A. Anti-smoking media campaign messages: Theory and practice. Health Communication 2007;22(2):91–102. [PubMed: 17668989]

Farrelly MC, Davis KC, Haviland ML, Messeri P, Healton CG. Evidence of a dose-response relationship between "truth" antismoking ads and youth smoking prevalence. American Journal of Public Health 2005;95(3):425–431. [PubMed: 15727971]

Goreley T, Gordon S. An examination of the transtheoretical model and exercise behavior in older adults. Journal of Sport & Exercise Psychology 1995;17:775–791.

Heatherton TF, Kozlowski LT, Frecker RC, Fagerstrom KO. The Fagerstrom test for nicotine dependence: A revision of the Fagerstrom tolerance questionnaire. British Journal of Addiction 1991;86:1119–1127. [PubMed: 1932883]

Hovland, C.; Janis, IL.; Kelly, H. Communication and persuasion. Yale University Press; New Haven, CT: 1953.

Hyland A, Wakefield M, Higbee C, Szczypka, Cummings KM. Anti-tobacco television advertising and indicators of smoking cessation in adults: A cohort study. Health Education Research 2006;21(3):348–354. [PubMed: 16740679]

Janis, IL. Effects of fear arousal on attitude change: Recent developments in theory and experimental research. In: Berkowitz, L., editor. Advances in experimental social psychology. Vol. 3. Academic Press; New York: 1967. p. 166-225.

Maddux JE, Rogers RW. Protection motivation and self-efficacy: A revised theory of fear appeals and attitude change. Journal of Experimental Social Psychology 1983;19:469–479.

Marcus BH, Eaton CA, Rossi JS, Harlow LL. Self-efficacy, decision-making, and stages of change: An integrative model of physical exercise. Journal of Applied Social Psychology 1994;24:489–508.

Martin RA, Rohsenow DJ, MacKinnon SV, Abrams DB, Monti PM. Correlates of motivation to quit smoking among alcohol dependent patients in residential treatment. Drug and Alcohol Dependence 2006;83(1):73–78. [PubMed: 16314049]

McKenna J, Gutierrez K, McCall K. Strategies for an effective youth counter-marketing program: Recommendations from commercial marketing experts. Journal of Public Health Management and Practice 2000;6:7–13. [PubMed: 10848486]

Mongeau, P. Another look at fear arousing messages. In: Allen, M.; Press, R., editors. Persuasion: Advances through meta-analysis. Hampton Press; Cresskill, NJ: 1998. p. 53-68.

Morman M. The influence of fear appeals, message design, and masculinity on men's motivation to perform the testicular self-exam. Journal of Applied Communication Research 2000;28:91–116.

National Cancer Institute. Cancer trends progress report - 2005 update. 2005. Retrieved November 1, 2006, from http://progressreport.cancer.gov

Ozer EM, Bandura A. Mechanisms governing empowerment effects: A self-efficacy analysis. Journal of Personality & Social Psychology 1990;58:472–486. [PubMed: 2324938]

Pechmann, C.; Goldberg, ME. Evaluation of ad strategies for preventing youth tobacco use: Annual report submitted to the California Tobacco Related Disease Research Program. University of California; Irvine, CA: 1998.

Pechmann C, Reibling ET. Planning an effective anti-smoking mass media campaign targeting adolescents. Journal of Public Health Management and Practice 2000;6:80–94. [PubMed: 10848488]

Prochaska JO, DiClemente CC. Stages and processes of self-change in smoking: Toward an integrative model of change. Journal of Consulting and Clinical Psychology 1983;51:390–395. [PubMed: 6863699]

Prochaska JO, DiClemente CC, Norcross JC. In search of how people change: Applications to addictive behaviors. American Psychologist 1992;47:1102–1114. [PubMed: 1329589]

Prochaska, JO.; Redding, CA.; Evers, KE. The transtheoretical model and stages of change. In: Glanz, K.; Lewis, FM.; Rimer, BK., editors. Health behavior and health education. Josey-Bass; San Francisco: 2002. p. 99-120.

Rimal RN. Closing the knowledge-behavior gap in health promotion: The mediating role of self-efficacy. Health Communication 2000;12:219–237. [PubMed: 10938914]

Rogers, RW. Cognitive and physiological processes in fear appeals and attitude change: A revised theory of protection motivation. In: Cacioppo, JT.; Petty, RE., editors. Social psychophysiology. Guilford; New York: 1983. p. 153-176.

Ruiter RAC, Verplanken B, de Cremer D, Kok G. Danger and fear control in response to fear appeals: The role of need for cognition. Basic and Applied Social Psychology 2004;26(1):13–24.

Siegel M, Biener L. The impact of an antismoking media campaign on progression to established smoking: Results of a longitudinal youth study. American Journal of Public Health 2000;90:380–386. [PubMed: 10705855]

Smalec JL, Klingle RS. Bulemia interventions via interpersonal influence: The role of threat and efficacy in persuading bulimics to seek help. Journal of Behavioral Medicine 2000;23(1):37–57. [PubMed: 10749010]

Stephenson MT, Witte K. Fear, threat, and perceptions of efficacy from frightening skin cancer messages. Public Health Reviews 1998;26:147–174. [PubMed: 10327830]

Sutton, SR. Fear-arousing communications: A critical examination of theory and research. In: Eiser, JR., editor. Social psychology and behavioral medicine. Wiley; London: 1982. p. 303-337.

Terry-Mcelrath Y, Wakefield M, Ruel E, Balch GI, Emery S, Szczypka G, et al. The effect of antismoking advertisement executional characteristics on youth comprehension, appraisal, recall, and engagement. Journal of Health Communication 2005;10(2):127. [PubMed: 15804904]

Wakefield M, Durrant R. Effects of exposure of youths at risk for smoking to television advertising for nicotine replacement therapy and Zyban: An experimental study. Health Communication 2006;19 (3):253–258. [PubMed: 16719728]

Wakefield M, Durrant R, Terry-McElrath Y, Ruel E, Balch GI, Anderson S, Szczypka G, Emery S, Flay B. Appraisal of anti-smoking advertising by youth at risk for regular smoking: A comparative study

in the United States, Australia, and Britain. Tobacco Control 2003;12(Supplement 11):ii82–ii86. [PubMed: 12878778]

Webb TL, Sheeran P. Does changing behavioral intentions engender behavior change? A meta-analysis of the experimental evidence. Psychological Bulletin 2006;132(2):249–268. [PubMed: 16536643]

Witte K. Putting the fear back into fear appeals: The extended parallel process model. Communication Monographs 1992;59:225–249.

Witte K. Fear control and danger control: A test of the extended parallel process model (EPPM). Communication Monographs 1994;61:113–134.

Witte K, Allen M. A meta-analysis of fear appeals: Implications for effective public health campaigns. Health Education & Behavior 2000;27(5):591–615. [PubMed: 11009129]

Witte K, Berkowitz J, Cameron K, Lillie J. Preventing the spread of genital warts: Using fear appeals to promote self-protective behaviors. Health Education & Behavior 1998;25:571–585. [PubMed: 9768378]
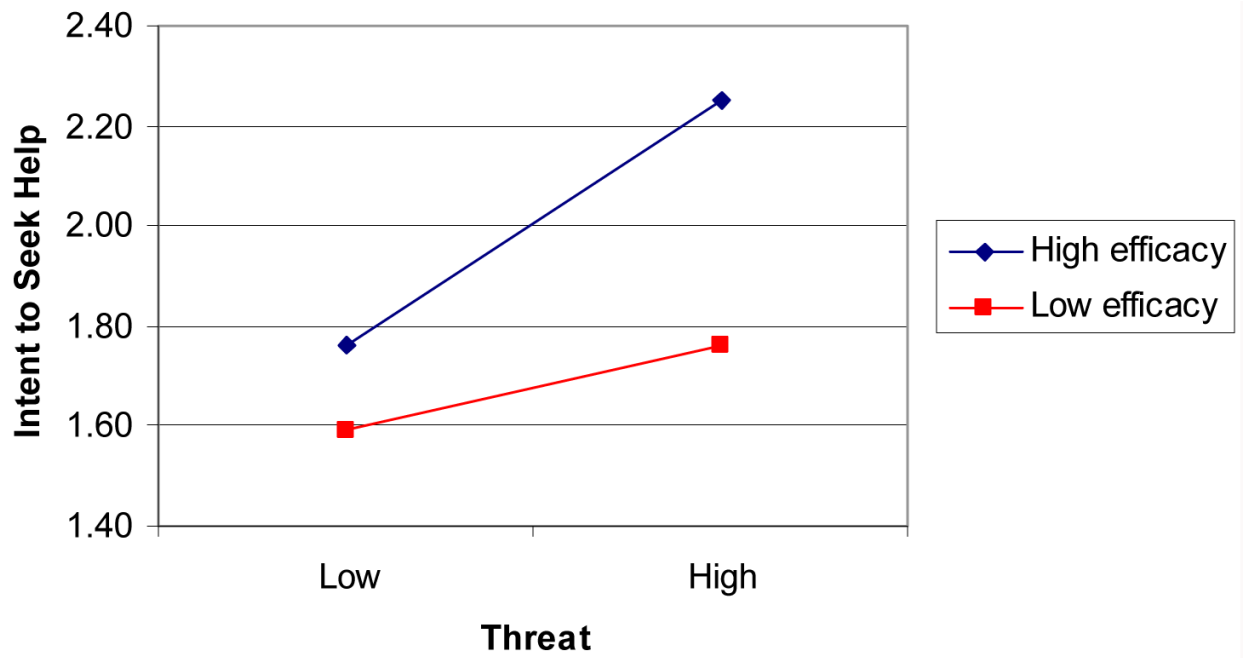
Figure 1.
Interaction Effect of Message Threat and Perceived Message Efficacy on Intent to Seek Help for Quitting.
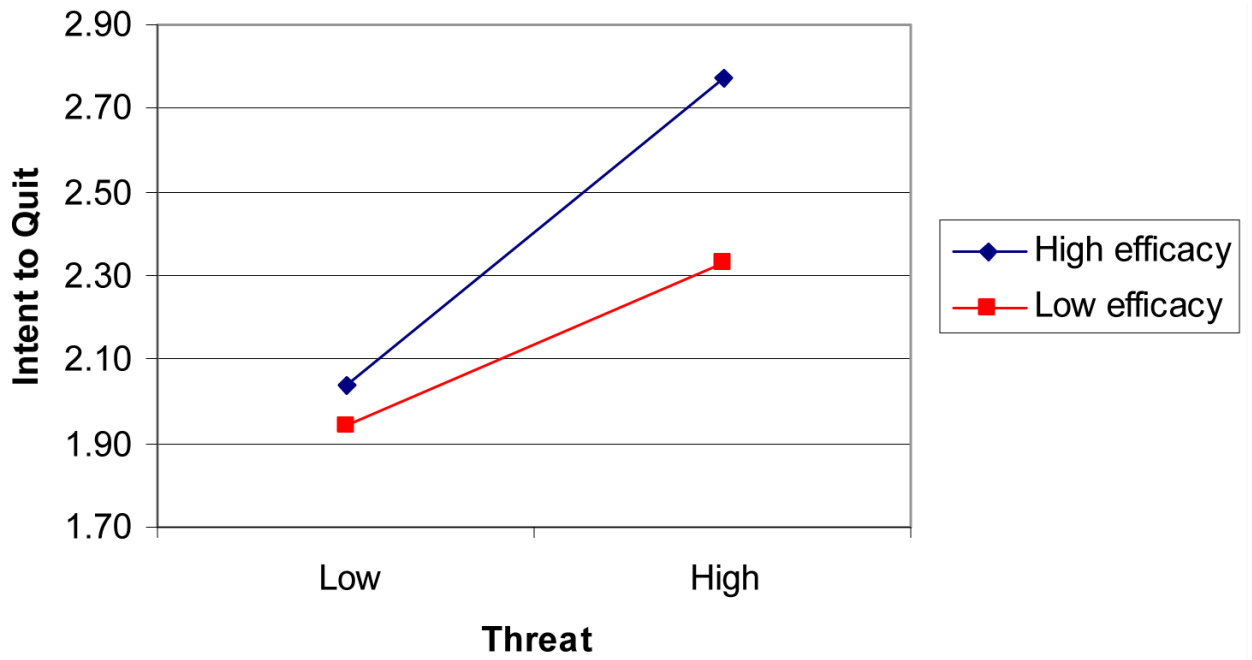
Figure 2.
Interaction Effect of Message Threat and Perceived Level of Message Efficacy on Intent to Quit Among Smokers With a Low Readiness to Quit.
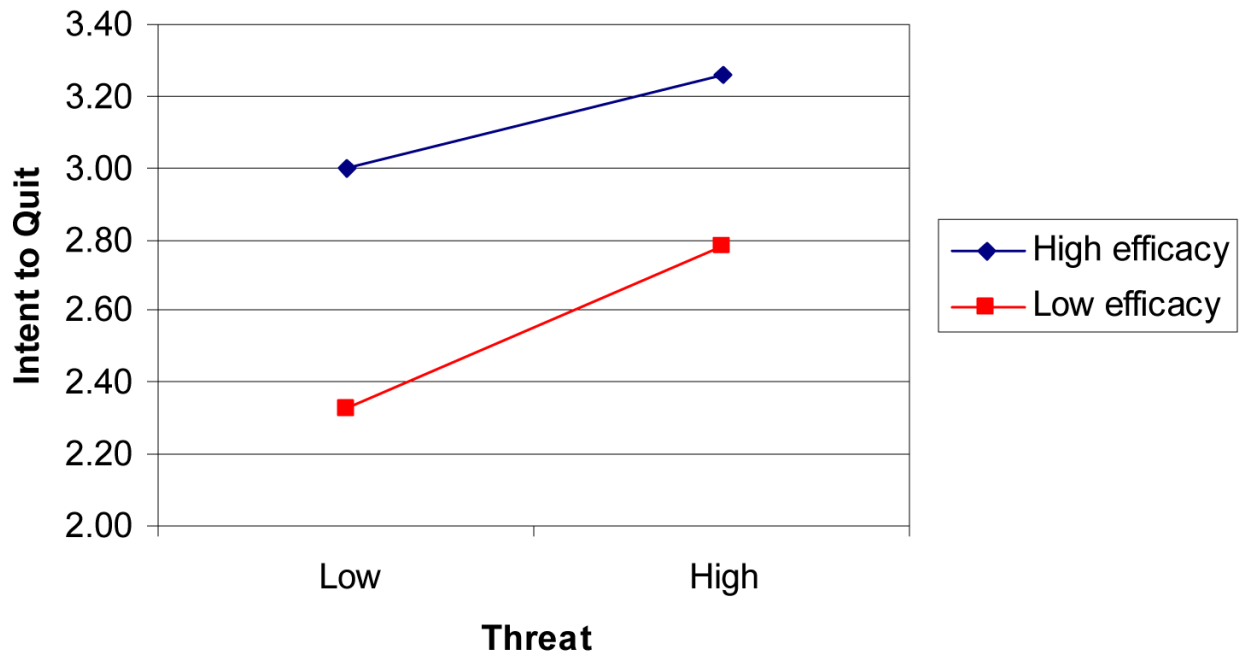
Figure 3.
Main Effects of Message Threat and Perceived Message Efficacy on Intent to Quit Among
Smokers With a High Readiness to Quit.

Table 1

Summary of Demographic Variables

Age	M = 55.17	s.d. = 11.63
Gender		
Male	N = 295	53.2%
Female	N = 260	46.8%
Education		
Less than high school	N=49	8.8%
High school	N=191	34.4%
Some college	N=231	41.6%
College or higher	N=84	15.1%
Ethnicity		
White	N=470	84.7%
Black	N=35	6.3%
Hispanic	N=25	4.5%
Mixed	N=12	2.2%
Other	N=13	2.3%

Table 2

Means and Standard Deviations for Smoking-Related Variables

Smoking-Related Variables	N	M	S.D.
Nicotine dependence	548	3.03	1.64
Perceived vulnerability to smoking harms	555	3.54	.86
Perceived benefit to quitting smoking	555	3.61	1.16
Smoking history (in years)	551	39.21	11.47
Number of previous quit attempts	551	4.73	8.47
Readiness to quit smoking	554	4.99	2.98
Intent to quit smoking	555	2.48	.78
Intent to seek help for smoking cessation	555	1.85	.77

Table 3

Adjusted Means and Standard Errors for Manipulated Variables by Conditions

Perceived Message Threat	Mean	Std. Error	N
A: 2 high threat ads followed by NRT ad	2.63	.09	105
B: 2 high threat ads followed by Quitline ad	2.60	.09	105
C: 2 low threat ads followed by NRT ad	2.09	.09	108
D: 2 low threat ads followed by Quitline ad	2.10	.08	119
E: 2 high threat ads	2.60	.08	118
Perceived Message Efficacy	Mean	Std. Error	N
A: 2 high threat ads followed by NRT ad	1.75	.08	105
B: 2 high threat ads followed by Quitline ad	1.68	.08	105
C: 2 low threat ads followed by NRT ad	1.66	.08	108
D: 2 low threat ads followed by Quitline ad	1.59	.07	119
E: 2 high threat ads	1.42	.07	118

Note: Conditions A, B, and E significantly differ from conditions C and D in perceived message threat (p<.01). Condition A significantly differ from condition E in perceived message efficacy (p<.05).