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## Smokers' Responses to Fearful and Disgust-Eliciting Anti-Smoking Media

Mark C. Goetz

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SMOKERS' RESPONSES TO FEARFUL AND DISGUST-ELICTING ANTI-  
SMOKING MEDIA

by

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Bachelor of Science, North Dakota State University, 2005  
Master of Arts, University of North Dakota, 2007

A Dissertation  
Submitted to the Graduate Faculty

of the

University of North Dakota

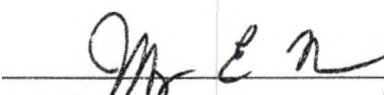
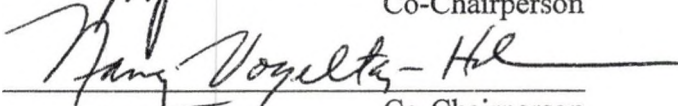
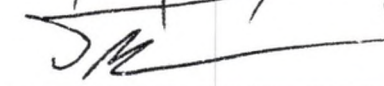
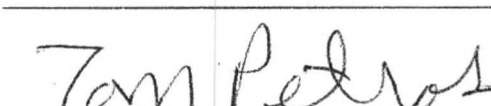
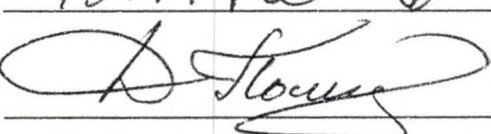
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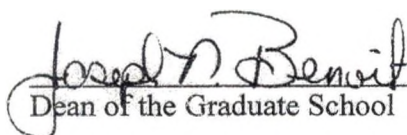
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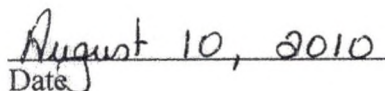
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This dissertation, submitted by Mark C. Goetz, M.A. in partial fulfillment of the requirements for the Degree of Philosophy from the University of North Dakota, has been read by the Faculty Advisory Committee under whom the work has been done and is hereby approved.

  
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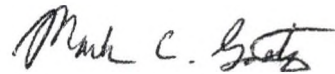
  
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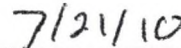
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## ABSTRACT

The purpose of this study was to build upon Wakefield and colleagues and Vogeltanz-Holm and colleagues hypotheses that anti-smoking ads are effective by means of eliciting negative emotional states, particularly disgust. In this study, we compared two sets of ads: those high in fear and disgust and those high in only fear. We hypothesized that subjective and physiological responses to ads high in fear and have a disgust component would be greater than for the fear-only ads. We also predicted that the ads high in disgust would have higher rates of recall and engagement. Last, we predicted that participants viewing fear with disgust ads, relative to participants viewing fear-only ads, would have greater readiness to quit as well as decreased smoking behavior at follow-up. Participants were smoking college students aged 18 to 25 years ( $N=81$ ). They viewed one of two sets of five randomly presented antismoking advertisements and filled out questionnaires assessing responses to each advertisement. Physiological responses (heart rate, skin conductance, and blood pressure) were also measured. Participants were then interviewed two weeks later to assess ad recall, saliency, and engagement. Results were mixed in that fear with disgust ads had higher ratings of disgust though not greater physiological reactivity than did the fear-only ads. Next, there were some unexpected interactions between participants' level of smoking and ad type on ratings of fear and disgust. Moderate smoking was associated with viewing the disgust with fear ads as less emotionally impactful than did low smokers. Contrary to the hypotheses, there were no differences between the conditions on measures of ad recall, engagement (i.e., thought



about or discussed), readiness to quit, or quitting behavior at follow-up. Possible explanations for these results are discussed. This study provides an initial exploration into examining specific types of negative emotion and has implications for the use of different methodology in examining the effectiveness of specific antismoking media.

## CHAPTER ONE

### INTRODUCTION AND LITERATURE REVIEW

The examination of media effects on smoking behavior is important for a number of reasons. First, cigarette smoking is the leading cause of preventable death in the United States, accounting for approximately 440,000 premature deaths each year (CDC, 2002). Approximately 21% of adults in the United States report currently smoking (CDC, 2006). Cigarette smoking also accounts for more than \$167 billion in annual health-related economic losses (CDC, 2005). Media messages can be especially important tools for preventing cigarette smoking in nonsmokers and persuading current smokers to quit smoking (McAlister et al., 2004). Specifically, media messages can reach diverse target audiences (e.g., urban, rural, those without healthcare) throughout communities and can be very cost effective (e.g., Secker-Walker, Worden, Holland, Flynn, & Detsky, 1997). Additionally, the Centers for Disease Control and Prevention (CDC) has acknowledged that statewide tobacco prevention programs that include an anti-tobacco media campaign component are among the most effective programs (CDC, 1999). There is an emerging consensus in the literature as to which types of ads are effective; however, there is poor understanding of *why* certain ads are more effective. The next important step in anti-smoking media research is identifying, describing, and testing purported mechanisms underlying an ad's effectiveness.

The following sections will first review the empirical literature on the effectiveness of various strategies used in anti-smoking media. Next, the use of



psychophysiological measures to examine individuals' responses to media messages will be discussed as one way for increasing our understanding of the effect of anti-smoking advertisements. Then, theories pertinent to the effectiveness of media messages will be briefly presented highlighting the consistencies and inconsistencies between suggested theoretical mechanisms and the empirical data regarding anti-smoking ads' effectiveness. Finally, the proposed study examining the hypothesized importance of eliciting fear and disgust responses for decreasing smoking behavior and increasing intention to quit will be presented and discussed in the context of both theory and the empirical literature.

#### *Empirical Examinations of the Effectiveness of Anti-tobacco Media*

The effectiveness of anti-smoking media will be reviewed by grouping studies according to research methodologies: focus group studies (Goldman & Glantz, 1998; Peracchio & Luna 1998); field studies (Vogeltanz-Holm, Holm, White Plume, & Poltavski, 2009; Biener, Ji, Gilpin, & Albers, 2004; Biener, McCallum-Keeler, & Nyman, 2000; Donovan, et al., 2003; Farrelly et al., 2002; Hill & Carol, 2003; Wakefield, Miller, & Roberts, 1999); controlled experiments (Henley & Donovan, 2003; Pechmann and Reibling, 2006; Terry-McElrath et al., 2005; Wakefield et al., 2003; Worden et al., 2003); epidemiology of risk factors (Biener, McCallum-Keeler, & Nyman, 2000; Borland & Balmfor, 2003; Donovan, et al., 2003; Wakefield, Freeman, & Donovan, 2003); and epidemiology of young adults and smoking (Henley & Donovan, 2003; Henriksen & Fortmann, 2002; Hersey et al., 2005; Morrison, Banas, & Burke, 2003; Sly, Heald, & Ray, 2001; Wechsler et al., 1998).

*Focus groups.* Goldman and Glantz (1998) examined data from 186 focus groups involving more than 1500 children and adults from and their reactions to 118 anti-

tobacco advertisements. Tobacco prevention and cessation advertisements were divided into eight ad themes: industry manipulation—a theme in which the tobacco industry is negatively depicted, the risks of secondhand smoke, tobacco addiction, tobacco cessation benefits, reducing youth access, short-term effects (e.g., showing short-term health and cosmetic effects), long-term health effects (e.g., showing long-term health effects), and romantic rejection due to tobacco use. The researchers found that for children, industry manipulation and secondhand smoke themes were the most effective at “denormalizing” and reducing cigarette consumption while cessation and addiction themes were also effective but only when used in association with the former two themes. The authors suggest that youth access, short-term effects, and long-term health effects are not effective theme strategies among youth.

In contrast, Peracchio and Luna (1998) conducted a study in which they assessed teenagers’ attitudes and beliefs toward smoking. Participants included 48 male and 58 female smoking and nonsmoking high school students aged 15 to 18 years who completed a questionnaire about smoking habits. The researchers conducted focus groups to discuss reasons youth smoke or do not smoke in addition to how anti-smoking media may be effective. In sum, they found that potentially effective advertising themes commonly mentioned by both smokers and nonsmokers included “grossness” of smoking as well as the negative health consequences of smoking.

*Field studies.* More recently, researchers have begun examining the effectiveness of anti-smoking campaigns that have been aired in communities over commercial radio and/or television. For example, Farrelly et al. (2002) compared the “Truth” campaign of the American Legacy Foundation to tobacco company Philip Morris’ “Think, Don’t



Smoke” campaign. The “Truth” campaign takes a direct approach and delivers facts about the harms of tobacco and the tobacco industry’s deceptive practices so that youth will “rebel” against industry manipulation (Farrelly et al., 2002). The “Think, Don’t Smoke” campaign in contrast uses only messages of “don’t smoke” or “just say no.” Exposure to the “Truth” campaigns was associated with a marginally significant decrease in the odds of current nonsmokers’ intentions to smoke in the next year while the “Think, Don’t Smoke” campaign was actually associated with a significant increase in the odds of youths’ intentions to smoke in the next year. In fact, there was a positive dose-response relationship between youth’s intentions to smoke in the next year and the number of these advertisements they had seen. Moreover, the “Think, Don’t Smoke” campaign was associated with more positive attitudes about tobacco companies.

Biener, McCallum-Keeler, and Nyman (2000) assessed adults’ receptivity to a Massachusetts television anti-tobacco campaign. Changes in smoking status, various affective ad qualities, and baseline tobacco control attitudes were examined. Ads were chosen to represent the dangers of environmental tobacco smoke, tips on quitting, health benefits of quitting, and the predatory and deceptive practices of the tobacco industry. The advertisements were rated on the following five qualities: positive emotions, negative emotions, strength of emotion elicited, cognitive quality, and helpfulness. Outcome variables included exposure to and recognition of the advertisements and receptivity (i.e., positive appraisal of the advertisement in terms of effectiveness). Receptivity was assessed with the following three measures: perceived effectiveness (an average rating for all the ads recognized by a participant), the proportion of respondents who reported “well done” ads versus the proportion of respondents who reported “poorly

done” ads, and perceived effectiveness for each individual advertisement. Three perceived effectiveness ratings were computed for each ad: one for ex-smokers, one for continuing smokers, and one for continuing non-smokers. Results indicated that for all three groups, effectiveness ratings were associated with the strength of emotional appeal. Advertisements that were rated high in positive emotion were rated as less effective. For nonsmokers and ex-smokers, effectiveness ratings were higher for advertisements that evoked negative emotions such as fear or sadness. Interestingly, for continuing smokers and ex-smokers, the strength of negative emotions was unrelated to the effectiveness rating; an exception to this finding was that smokers who reported being ready to quit did perceive advertisements that elicited high levels of negative emotion as effective. Similar to Farrelly et al. (2002), Biener (2002) found youth rated ads containing serious consequences of smoking and eliciting negative emotional arousal as more effective than they did Phillip Morris advertisements and advertisements that did not discuss illness.

Biener, Ji, Gilpin, and Albers (2004) did a longitudinal survey in 1993 and 1997 with use of the initial 1993 Massachusetts Tobacco Survey of youth aged 12 to 17 years ( $N=618$ ). They examined the message, the reach and frequency of the ad broadcast, and most importantly here, the emotional tone of the advertisement. These researchers found that ads with messages about health consequences and ads that had been previously coded as high in negative emotion were more likely to be recalled and were perceived as more effective than ads with a normative information/education approach or those ads that used humor. There were some gender differences in the recall of the ads though the researchers stated these findings with caution as gender differences are unusual in the anti-smoking literature.



In addition to the emotional tone and content of ads, it is also important to consider the source of the ad when examining effectiveness. Biener et al. (2006) examined the various sources that individuals aged 18 to 30 years used for help to quit smoking. These individuals were in the age range exposed to the Massachusetts anti-tobacco campaign that ran from 1993 to 2001. The researchers found that advertisements were the most frequently mentioned source of help in comparison to conventional aids: nicotine replacement products, prescription medications, self-help materials, quit-smoking programs, health professionals, telephone quit line, or web-based help. Older, more dependent smokers were most likely to find conventional aids helpful while younger smokers and those who had been abstinent for more than six months were most likely to report being helped by television ads. In addition, they provided evidence that the ads had an identified, specific impact on these individuals. They found that 88% of the individuals reporting that an anti-tobacco television ad contributed to their quitting smoking were able to provide a description of at least one ad that had a significant impact on them. In all, the two types of ads that were reported as being most helpful were those ads that depicted illness due to smoking and those that provided inspirational quit tips. Other studies have suggested that ads that provide an inspirational quit tip can be classified as emotionally arousing (Biener, McCallum-Keeler, & Nyman, 2000) much like the ads depicting illness are meant to do. These findings provide more support for the idea that emotionally arousing ads are more effective than other ads.

Similar to Biener et al. (2006), Vogeltanz-Holm et al. (2009) conducted a field anti-tobacco campaign targeting rural youth. The study found that television and radio ads with the highest recall and the greatest perceived effectiveness by youth aged 12 to

17 years were those ads depicting graphic physical health harms of tobacco and were ranked highest in “fear” and “disgust.”

These findings, suggesting the importance of eliciting negative emotions in anti-tobacco media campaigns, are consistent with the theoretical and empirical work of Wakefield and her colleagues in Australia (Wakefield et al., 2003). Negative emotion as an effective ad mechanism in anti-smoking campaigns has been the impetus behind the development of the Australian National Tobacco Campaign (NTC) (Hill & Carol, 2003). This campaign, launched in 1997, was designed for a target audience of 18 to 40 year old smokers; therefore, smoking cessation was a major goal. By emphasizing the evidence of negative consequences resulting from smoking, the strategy was to communicate scientific knowledge about smoking risks (Wakefield, Freeman, & Donovan, 2003) and create a paired association between the negative emotions resulting from the advertisement and smoking (Hill & Carol, 2003). White, Tan, Wakefield, and Hill (2003) also suggest that the NTC was founded, in part, upon health behavior change theories including the Health Belief Model. This campaign has resulted in an opportunity for a great deal of research examining the effectiveness and components of these advertisements on smoker attitude and behavior change. NTC field study research relevant to the current study is outlined below.

Donovan et al. (2003) interviewed 9,033 participants to examine smokers’ awareness of and reaction to the NTC’s anti-smoking advertisements. Their approach used continuous information tracking (CIT) to investigate the relationship between media weight and tobacco-related attitudes, beliefs, intention, and quitting behavior. CIT uses target audience rating points (TARPS), which are a standard measure of the media weight



(Donovan et al., 2003). Participants were surveyed across three phases, each approximately one year apart. The first phase lasted for 27 weeks in the city of Melbourne; the second phase was eight weeks in the cities of Sydney and Melbourne; and the third phase lasted eight weeks in the cities of Adelaide, Sydney, and Melbourne. The telephone survey assessed ad recall, salience of thoughts about quitting, cessation intention/attempts, and beliefs about the health effects of smoking, and other attitudes and dispositions about smoking. In addition, an overall index of quitting intention and behavior (Quindex) was constructed using a variety of measures pertaining to smoking status, anticipated smoking status in the near future, and quitting behavior. A higher Quindex score indicated greater intention to quit and more quitting behavior.

Results indicated that cued recall of any anti-tobacco advertising in phase one reached a high of 83% during week four before dropping to a steady 51% over the last few weeks of the campaign. In phase two, baseline cued recall was 24% and around week four cued recall peaked at 59%. In phase three, reported awareness was 54% at pre-campaign and again peaked at 77% during week four. The researchers found that these variations in cued recall/recognition were related to the TARPS. Upon examination at the individual advertisement level, the researchers found that at their peaks, the *Artery* ad was recalled by 65% of respondents, the ad *Lung* was recalled by 40%, the ad *Brain* was recalled by 23%, the ad *Tumor* was recalled by 15%, and the ad *Call for Help* was recalled by 10%. The most recalled ads (e.g., *Artery*, *Lung*, *Brain*, and *Tumor*) are all graphic ads showing the physical harm of smoking. In fact, health effects advertisements were recalled by more individuals than the other advertisements. During phase one baseline, 31% of smokers indicated that as a result of recent advertising they had seen,



they were more likely to quit than they were before having seen the ads. By week 11 of the campaign, that percent had risen to 70% before dropping by the end of the campaign to 50%. Similarly, the Quindex score showed a gradual upward trend throughout the campaign suggesting that smokers moved toward quitting. Despite those promising findings, the telephone survey results provided no evidence over the course of the campaign that respondents had actually attempted to quit.

White et al. (2003) sought to examine adolescents' awareness of and responses to the NTC, originally designed for adults aged 18 to 40 years. They gathered information from two samples of youth. The first group ( $N=400$ ) were aged 14 to 17 years and were surveyed by phone. The second group ( $N=3714$ ) were aged 12 to 17 years and were surveyed in 67 secondary schools in the Australian State of Victoria. Main outcome measures in both surveys included awareness of, and response to, the advertisements. Overall awareness of the campaign was high, with 60% to 80% of adolescents being aware of advertising about the health effects of smoking and 90% to 97% recognizing the NTC slogan upon prompted recall. Two-thirds of adolescents who were current smokers thought the advertisements had resulted in them being more likely to quit. In addition, 86% of nonsmokers indicated that the campaign had made it easier for them to stay a nonsmoker. In the school sample, 18% of current smokers reported attempting to quit in response to the advertisements and 22% of those who had quit, said the advertisements were influential in their decision. Also in this sample, 26% of smokers said they had thought about quitting, 27% cut down on the number of cigarettes they smoked, 12% talked to their friends about smoking, and 67% of smokers reported that they were more likely to quit smoking in response to the NTC advertisements.

These results suggest that, despite the NTC being targeted at adults and having strong cessation messages, the campaign also had a positive impact on adolescents, both those already smoking and those that were not smoking. Unlike the Donovan et al. (2003) study, there was also agreement with campaign-related beliefs and a significant number of nonsmoking adolescents reported being less likely to smoke after the campaign, while a significant number of smoking adolescents reported quitting or at least reducing tobacco use.

Finally, in the national evaluation report of the campaign, Wakefield et al. (1999) compared youths' recognition and responses to the South Australian Smoking and Health Project (SASHP) campaign to adults' recognition and responses to the concurrently running NTC campaign. The SASHP campaign was aimed at 10-17 year olds, featured six vignettes each showing some of the short-term consequences of smoking relevant to this target group, and had a tag line stating, "Smoking – you're smarter than that." Surveys were used to gather information about a wide range of health issues including smoking behavior as well as recall of the media advertising. Surveys were conducted with South Australians ( $N = 3019$ ) aged 15 years and older. The respondents were shown photographs of scenes in the advertisements from the SASHP and NTC campaigns and were asked if they had seen the advertisement. Smokers were then asked if seeing the advertisements made them more uncomfortable about their smoking and if the advertisements made them more likely to try to stop smoking.

Results indicate that 95% of all respondents and 94% of smokers aged 18 to 40 years recalled seeing one of the NTC advertisements. Overall, 63.6% of smokers agreed or strongly agreed that the advertisements made them uncomfortable about their smoking



and 50.5% agreed or strongly agreed that the advertisements made them more likely to try to stop smoking. In terms of specific advertisements, recognition was generally higher for *Artery* than *Tumor* or *Lung*. Similar to the White et al. (2003) findings, there were high levels of recognition and positive responses for the adult-focused advertisements among youth aged 15 to 17 years. In fact, Wakefield et al. (1999) reported that youth smokers reported being less comfortable about their smoking in response to the adult focused ads (53.4%) than the youth focused ads (34.6%). More youth also agreed with statements indicating that they were more likely to quit due to the adult focused ads (61.3%) than the youth focused (30.8%). The campaigns differed in the following ways: target audience (youth vs. adult), aim of campaign (prevention vs. cessation), campaign message (short term consequences vs. long term health problems), and the delivery method (vignettes vs. graphic visceral images). Given these data, it is important to note that anti-tobacco media messages containing information about cessation techniques, information about long-term health problems, and using graphic visceral images may be effective in youth anti-smoking campaigns.

*Controlled experimental field studies.* Worden et al. (1996) placed emphasis on potential gender differences in designing and developing a mass media smoking prevention campaign. The researchers followed two treatment groups over a four-year period. One group received mass media messages in conjunction with a school-based program, while the other received a school-based program only. The effect of school-based only versus the combined school and media program was assessed by means of an annual classroom survey over a five-year period. The survey assessed smoking behavior and possible mediating variables such as exposure to interventions and mass media use

preferences. In addition, long-term impact of the program on smoking behavior was examined via a school survey two years later. The educational objectives were intended to have the following effects: positive attitude toward nonsmoking, negative view of smoking, skills for refusing cigarettes, and the perception that most young people do not smoke. The media campaign consisted of television and radio advertisements, which contained the same education objectives of the school program. Results were such that the combined school-based and media program had a significant preventive effect on youth smoking initiation compared to the school-based program without the media program. Smoking behavior effects were maintained at the two-year follow-up. Ads that included dramatization of refusal or youth quitting testimonials were the most highly rated for both girls and boys. However, in general, girls reported liking all ads significantly more than did the boys.

*Controlled laboratory studies.* Henley and Donovan (2003) assessed whether young adult smokers aged 16 to 25 years would respond more negatively to messages emphasizing or threatening death as a likely consequence of smoking than would older smokers aged 40 to 50 years. One theory is that youth may have an immortal feeling (Henley & Donovan, 2003) or experience psychological reactance (Brehm, 1966; Brehm & Brehm, 1981; Dillard & Shen, 2005) to such messages. Henley and Donovan's finding however, suggested that younger and older smokers did not significantly differ in their "response" (conceptualized by a six-item scale consisting of attitudinal, motivational, and intentional responses) to death or non-death threats. In fact, the data trended toward younger smokers actually responding more than older smokers to threats.



Wakefield et al. (2003) examined 615, 8<sup>th</sup>-, 10<sup>th</sup>-, and 12<sup>th</sup>-grade students in the United States, Australia, and Britain who were susceptible nonsmokers or experimenting smokers. In other words, those youth who have not smoked but have disclosed information that makes them a “higher risk” to smoke, or those that have smoked but had fewer than 100 cigarettes (Choi, Gilpin, Farkas, & Pierce, 2001; Pierce, Choi, Gilpin, Farkas, & Merritt, 1996). In groups of 15, participants were shown one of five videotaped reels of ads each containing ten anti-smoking ads and one control ad about a hairstyling product. Each advertisement was coded for *primary target audience* (i.e., youth or general audience), *main theme* (i.e., cessation methods or strategies, health effects of smoking, health benefits of quitting, secondhand smoke, exposing tobacco industry manipulation, parental or sibling guidance about tobacco, advertisements portraying tobacco as “uncool,” or other) and for the presence or absence of two *executional characteristics* (i.e., personal testimony and negative visceral image). Participants viewed each of the advertisements twice and responded after each viewing to 16 emotive statements about the advertisement.

At one-week follow-up, Wakefield et al. (2003) calculated an “impact” score and found that of the ten ads with the highest impact scores, four were aimed at a youth audience. Each of these four ads featured either personal testimony or visceral negative characteristics and included the following themes: health effects, secondhand smoke, and industry manipulation. Youth were more likely to report that advertisements using the theme of “health effects” were ads that most “stood out” from the other ads and they were less likely to discuss with friends advertisements with an “uncool” theme (ads emphasizing youth choice, such as those developed by Philip Morris).

Terry-McElrath et al. (2005) employed a similar method to that of Wakefield et al. (2003) in the examination of emotional and cognitive responses to ads. Participants in this study included 8<sup>th</sup>-, 10<sup>th</sup>-, and 12<sup>th</sup>-grade Boston and Chicago students who were susceptible nonsmokers or experimenting smokers. Participants were shown one of ten videotaped reels of ads each containing ten anti-smoking ads. Each advertisement was coded for *primary target audience* (i.e., youth or general audience), *main theme* (i.e., cessation methods or strategies, health effects of smoking, health benefits of quitting, secondhand smoke, exposing tobacco industry manipulation, parental or sibling guidance about tobacco, advertisements portraying tobacco as “uncool,” or other), for the presence or absence of two *executional characteristics* (i.e., personal testimony and/or negative visceral image), and for one of three types of sponsors (i.e., state-sponsored ads from the American Legacy Foundation truth campaign, tobacco company-sponsored ads, and those sponsored by pharmaceutical companies).

Much like Wakefield et al. (2003), one-week follow-ups of the following outcome variables were assessed: appraisal (how good participants thought the ad was and which ad stood out) and engagement (ad recall, having thought about the ad, and having discussed the ad with others). Results indicated that the ads coded as “personal testimony” and “visceral negative” had the strongest effects on ratings of appraisal, recall, and engagement. In bivariate analyses, participant ratings of ads with these two characteristics had ratings for “how good” and “most stood out” that were significantly higher than for the other characteristics. The mean proportions for these measures were significantly lower for ads with cessation, industry manipulation, and uncool themes when compared with the theme of health effects. Finally, measures of recall and



engagement (i.e., the two ratings of having thought about and discussed the ad), were significantly related to “visceral negative” and “personal testimonial” executions.

Pechmann and Reibling (2006) sought to examine the role of emotions in the context of more realistic television viewing situations. A total of 1725 9<sup>th</sup>-grade students viewed one of nine videotapes each containing a TV show with ads that included either a set of anti-smoking ads of a particular type or a set of three public service announcements serving as control ads. The researchers found that ads that elicited disgust and that focused on consequences from serious tobacco-related illness can enhance ratings of anti-industry motivation and decrease ratings of intent to smoke. The researchers also conducted standard regression-based analyses using the disgust ratings of the ads as a covariate which resulted in nonsignificance in the main effect of ad type. This indicates that greater disgust was a cause of anti-industry motivation. Additionally, in comparison to the control condition, the higher effectiveness ratings of the ads, the more the ads lowered mean smoking intent.

Finally, Goetz, Holm, Vogeltanz-Holm, White Plume, and Peterson (2007) examined emotional and physiological responses of heart rate and skin conductance (SC) to anti-smoking media messages among smokers and nonsmokers. Participants were then interviewed one week after the laboratory session to assess recall and engagement. No significant gender or smoking status differences emerged. Participants rated particular ads as most effective and as having evoked the most negative emotion (e.g., *Voicebox*, *Artery*, and *Still Can't Quit*). Heart rate responses supported self-report findings in that the ads eliciting more negative emotion were associated with greater heart rate deceleration. Analyses of follow-up data showed that the ads eliciting more negative



emotion (i.e., fear) in the laboratory (e.g., *Voicebox*, *Artery*, and *Still Can't Quit*) were also more likely to be recalled, thought about, and discussed over the one-week follow-up.

*Studies examining smokers' responses to ads.* Although many of the anti-smoking campaigns and studies have focused on prevention and have targeted nonsmokers, some campaigns and researchers have examined mass media campaigns targeting smokers and have found promising anti-smoking advertising results across groups. Such an emphasis is essential given some discussion within the literature regarding participant smoking status differences in reactions to anti-smoking advertisements.

As previously discussed, Donovan et al. (2003) found that throughout the NTC in Australia, a significant number of smokers indicated that they were more likely to quit as a result of viewing the NTC messages (50% at the end of the campaign). In addition, the Quindex score showed a gradual upward trend throughout the campaign indicating more intention to quit smoking and less smoking behavior.

Borland and Balmfor (2003) specifically examined the impact of the NTC on smokers' movement towards quitting. They measured the frequency and emotional valence of thoughts about smoking and passive smoking, thoughts about the conduct of tobacco companies, as well as participants' perspective on smoking behavior change including quitting. The study supported the use of anti-smoking campaigns for moving smokers forward through the stages of change toward quitting smoking. More specifically, smokers had increased frequency of thoughts about the harm of smoking and greater self-reported quitting for a month following the onset of the campaign.

Wakefield, Freeman, and Donovan (2003) focused on adult smokers' and recent quitters' recall of, and response to, NTC advertisements across surveys each year from 1997 until 2000. Their results indicated that approximately half of the smokers who recognized the campaign advertisements reported they were more likely to quit as a result. Additionally, in 1997, 60% of recent quitters indicated that seeing the advertisements helped prevent them from relapsing; although this number dropped to 44% in a follow-up study in 2000. They also found that advertisements that use graphic advertising to emphasize health risks of smoking seem to be effective both in terms of influencing attitudes and recall of the advertisement.

Although these studies have focused on overall campaign effectiveness, it is important to address which advertisements within a campaign are most effective. Researchers have found that media messages with stronger emotional appeals tend to have the higher effectiveness rating among both smokers and those who have recently quit smoking (Biener, McCallum-Keeler, & Nyman, 2000). Such findings have been true for both smokers and nonsmokers (e.g., Goetz et al., 2007). Biener, McCallum-Keeler, and Nyman (2000) also found that smokers, who have expressed a readiness to quit, rated advertisements that elicit negative emotions as most effective.

*Anti-smoking campaigns and effectiveness among young adults.* As previously discussed, Henley and Donovan (2003) found that a young adult sample had a greater response to threat messages in anti-smoking advertisements than did older adult smokers. Similarly, Hersey et al. (2005) suggested that the "Truth" campaign exerts a stronger effect for older teens than on younger teens. Thus, further examination of anti-smoking advertisements on young adults aged 18 to 24 years is suggested.



Some researchers have suggested increasing anti-tobacco media focus on the young-adult and college student populations (e.g., Rigotti, Lee, & Wechsler, 2000) because the tobacco industry has increased its focus on this age group by implementing marketing and promotions in “adult only” establishments such as bars and clubs (Ling & Glantz, 2002; Sepe, Ling, & Glantz, 2002; Sepe & Glantz, 2002). Biener and Albers (2004) suggest that young smokers aged 18 to 30 years are more likely than older smokers to smoke occasionally, and to smoke fewer cigarettes. Their data also show that youth in their sample are more attracted to tobacco advertising and are more than twice as likely to go to bars and clubs. The importance of this issue is confirmed by research suggesting that there has been an increase of smoking initiation among young adults (Lantz, 2003; Rigotti, Lee, & Wechsler, 2000; Wechsler, Rigotti, Gledhill-Hoyt, & Lee, 1998). Wechsler et al. (1998) examined data from the Harvard School of Public Health College Alcohol Study, which included students in 116 nationally representative four-year colleges and found that 11% of college smokers had their first cigarette and 28% began to smoke regularly at the age of 19 years or older. Everett and Husten (1999) suggest initiation rates for daily smoking among individuals 19 years and older are closer to 19%, which still represents a substantial proportion of the adults who smoke.

Young adults’ exposure to *Philip Morris*’ anti-tobacco ads has also been examined. Henriksen and Fortmann (2002) conducted a controlled experiment in which young adults ( $N=218$ ) aged 18 to 25 years viewed a variety of *Philip Morris* youth smoking prevention advertisements. Participants’ thoughts and opinions about several corporations, one being *Philip Morris*, were measured prior to viewing the ads. *Philip Morris* was rated positively by 16%, neutrally by 28%, and negatively by 56%. Only

slightly over half of the participants knew that Philip Morris was a tobacco company. Interestingly, there was no association between knowledge or opinion of *Philip Morris* and a participant's smoking status. Participants were then shown one of three kinds of advertisements (*Philip Morris* youth smoking prevention, *Philip Morris* charitable works, or control ads) and asked to rate the ad effectiveness. Participants who knew that *Philip Morris* was a tobacco company rated the industry ads significantly less favorably than the other ads. Such findings provide additional support for the importance of industry manipulation ads such as those in the "*Truth*" campaign to educate young adults about the tobacco industry and its practices. For example, favorable reactions to "*Truth*" ads are associated with negative beliefs about the tobacco industry. In addition, youth with high versus low knowledge of the tobacco industry's manipulative practices have been shown to be 14 times less likely to initiate smoking at an 18-month follow-up (Sly, Heald, and Ray, 2000).

Morrison, Banas, and Burke (2003) surveyed 206 college students to examine attitudes and beliefs about smoking. Participants completed a questionnaire containing semantically differential items assessing the attractiveness, intelligence, and risk of smoking. Open-ended questions were also used to assess participants' beliefs and perceptions about smoking. Results suggested that smoking status among college students is related to attitudes about the attractiveness, riskiness, and intelligence of cigarette smoking. More specifically, nonsmokers reported having beliefs about not smoking for health reasons. They also reported that smoking was more unattractive than did ex-smokers and smokers. Both nonsmokers and ex-smokers reported smoking being



more risky and less intelligent than did smokers. The number one reason that smokers gave for initiating tobacco use was peer pressure.

Hersey et al. (2003) reviewed data from the Legacy Media Tracking Survey (LMTS), a national survey of 6875 youth aged 12 to 24 years that assessed tobacco use, exposure to countermarketing messages, and beliefs and attitudes that are associated with tobacco use. Participants in states with exposure to the Legacy Media Anti-smoking Campaign reported more negative beliefs about industry practices. The authors assert that these beliefs led to negative attitudes toward the tobacco industry which accounted for variation in smoking status.

#### *Empirical Examination of Anti-smoking Advertisements in Summary*

Research indicates that there are specific types of advertisements that appear to be most effective in influencing smoking behavior. It appears that themes such as industry manipulation, secondhand smoke, and negative health consequences are more effective than other themes. In a more general sense, ads that elicit negative emotion appear to be more effective than other ads. One such negative emotion is fearfulness as described by some researchers, and as a visually elicited unrelieved visceral “ugh” response as described by others. Additionally, there is evidence in field studies and experiments to suggest that smokers and nonsmokers as well as various age groups respond similarly to the use of these anti-smoking campaign strategies. Despite this general base of knowledge, more research is needed to understand how young adults respond to certain anti-smoking advertisements. Few researchers have examined the “negative emotion” theory in a controlled manner. Stated another way, clear definitions of negative emotion or “the ugh” response (i.e., disgust) and fear have not been put forth. The disgust

response may best be discussed in terms of physiological reactions to the advertisements. Thus, a discussion of psychophysiology and media will be important in providing a basis for such a contribution to the literature.

### *Psychophysiology and Media*

Physiological measurement of emotion can be more beneficial than measuring verbal self-reports alone as they can give further information about viewer attention and visceral responses to stimuli (LaBarbera & Tucciarone, 1995). Additionally, objectively measured emotions can be important predictors of behavior (Lang, 1995). Although psychophysiological measures have rarely been used to examine anti-tobacco media advertisements, they have been used to examine impact of marketing media. Clancy (1990) suggests that nonverbal response measures (e.g., SC and brain waves) have become, and will continue to become popular for evaluating copy and other components of marketing. Thus, it seems important to obtain physiological measures of emotional arousal as a way of further examining the mechanisms underlying the effectiveness of anti-tobacco media messages.

Ravaja (2004) reviewed studies in which heart rate, facial electromyography, and electrodermal response (EDR) were used as measures of arousal and valence in response to media stimuli. These measures were examined because they are the more commonly used measures of attention and emotion in media research. Ravaja reported that previous studies found that participants' EDR responses were greatest compared to other psychophysiological responses, when viewing negatively arousing compared to positively arousing media (e.g., Simons, Detenber, Roedema, & Reiss, 1999). Simons et al. (1999) found greater heart rate deceleration in response to media with a negative



valence and to generally highly arousing media compared to media with a positive valence. Nikula (1991) examined nonspecific SC responses and the cognitions associated with them. Participants were presented with a signal and asked to report what they were thinking prior to the signal and to rate their thoughts using several dimensions. Examples of “thinking questions” that participants were asked to rate were as follows: “How present were the imagery?,” “How present was arousal?,” “How present was an emotion?” Results indicated that certain cognitions were associated with EDRs. Experienced arousal, negative emotion, current concern, and inner speech were associated with significantly greater nonspecific skin EDRs compared to an absence of phasic activity. These findings suggest that cognitions consisting of reported negative emotion, of particular interest in the current study, can be examined by measuring EDRs.

Goetz et al. (2007) was the first to examine the role of both self-report and physiological responses (heart rate and skin conductance) to anti-smoking media messages. In this study, six randomly presented ads meant to elicit varying emotional responses. Results were that heart rate deceleration ratings were highest for the ads that participants also rated as highest in eliciting fear responses. This finding provides additional support for developing a theoretical causal explanation for why certain ads are effective anti-smoking media messages.

#### *Theoretical Underpinnings of Effective Anti-tobacco Media Messages*

Several theories are pertinent to understanding how anti-smoking campaigns may affect smoking behavior. Some of these theories are quite similar in many ways and typically explain advertising effectiveness using principles from cognitive and/or behavioral psychological research. Most of these theories were developed to explain how



people react to persuasive communication, and more recently have been used to address responses to anti-smoking media. These theories are briefly presented as a foundation for further understanding and interpreting the effectiveness of different types of tobacco use prevention media.

### *Cognitive and Social Theories and Anti-smoking Media Messages*

*Theory of Reasoned Action.* The Theory of Reasoned Action (Ajzen & Fishbein, 1980; as cited in Kohler, Grimley, & Reynolds, 1999) suggests that behavioral intentions are, in part, a function of an individual's attitudes; while, in turn, a person's attitudes toward a particular behavior are a function of (a) his/her belief that the behavior results in a particular outcome and (b) his/her evaluation of that outcome. This theory also states that behavioral intention is partly a function of the subjective norm. Subjective norm is determined by beliefs about what significant others think one should do and one's motivation to comply with those individuals (Kohler, Grimley, & Reynolds, 1999). For example, individuals' beliefs about tobacco industry practices should change as a result of being exposed to counterindustry advertising campaigns that promote negative beliefs/attitudes about the tobacco industry (e.g., Hersey et al., 2003).

*Theory of Planned Behavior.* The Theory of Planned Behavior extends the Theory of Reasoned Action by adding the concept of perceived behavioral control (Ajzen, 2001; Ajzen, 1991; Kohler, Grimley, & Reynolds, 1999). Perceived behavioral control is a person's perception of how difficult a behavior is to perform given his or her own abilities (Ajzen, 1991). For example, a person's belief regarding his/her ability to say no to smoking would influence his/her response to a tobacco prevention media

message. This concept of perceived behavioral control is similar to that of self-efficacy in social cognitive theory (Bandura, 1986), which is discussed below.

*Social Inoculation Theory.* The Social Inoculation Theory (McGuire, 1964) suggests that cognitive resistance to attempts at persuasion will be greater if an individual has learned counterarguments to previous or expected attempts to persuade or influence his/her beliefs or attitudes. Counterindustry advertising campaigns in tobacco prevention do this by using what has been called social inoculation. Social inoculation involves exposing individuals to hypothetical scenarios in which they are pressured or influenced to smoke and then giving them information they can use to resist such influences and pressures (e.g., Hershey et al. 2005). Anti-tobacco advertising themes that are consistent with social inoculation theory are counterindustry manipulation, secondhand smoke, health benefits of quitting, and the health effects of smoking.

*Health Belief Model.* A fourth theory, the Health Belief Model (HBM), explains behavior through expectancies. In this theory, behavior is a function of the subjective value of an outcome and the subjective expectation that an action will achieve that outcome (Rosenstock, 1990). In other words, occurrence of a particular behavior is based on how much one values a particular health goal as well as on one's belief that a specific action or behavior will result in achieving the valued goal (Rosenstock, 1990). The HBM consists of several interacting components which attempt to explain health behavior: perceived susceptibility and severity, perceived benefits and barriers, perceived self-efficacy, and cues to action. In the case of anti-tobacco media the HBM suggests that increasing perceived severity/consequences and perceived susceptibility to such consequences will combine to increase perceived threat from a disease and that higher



perceived threat will increase the likelihood one will engage in an advocated health action (Kohler, Grimley, & Reynolds, 1999).

*Psychological Reactance.* Psychological Reactance is another theory that is relevant to understanding the effectiveness of anti-tobacco media messages. This theory posits that when a freedom is eliminated or threatened with elimination, a motivational state occurs in which the individual seeks to reinstate that freedom (Brehm, 1966; Brehm & Brehm, 1981). This theory can be applied to anti-tobacco media in a number of ways. First, various studies have shown certain advertising campaigns (e.g., Philip Morris' *Think. Don't Smoke*) are not effective in preventing youth from smoking and can actually result in more favorable attitudes toward the tobacco industry and a greater likelihood of smoking (Farrelly et al., 2002 as cited in Henriksen & Fortmann, 2002). These industry-sponsored ads generally implore parents to talk to their kids about not smoking, and it is possible that teens "react" to the implied parental control by rebelling and perceiving cigarette smoking more favorably. Wakefield et al. (2006) also suggests that tobacco company-funded ads can have harmful effects on youth exposed to these parent-targeted ads. They found that exposure to these ads was associated with lower perceived harm of smoking, stronger approval of smoking, stronger intentions to smoke in the future, and a greater likelihood of having smoked in the past 30 days.

Although psychological reactance may actually increase smoking in such campaigns, reactance can also be used to explain the effectiveness of anti-smoking campaigns that include messages about how the tobacco industry manipulates youth into smoking (i.e., industry manipulation advertising). These messages are believed to elicit a rebellious response toward the industry leading to a less favorable perception of smoking

(Hershey et al. 2005). For example, as Farrelly et al. (2002) demonstrates, reactance can be used to an anti-smoking campaign's benefit by exposing the manipulative practices of the tobacco industry and therefore turning youth rebellion back onto the industry.

*Social Cognitive Theory.* Social Cognitive Theory is applicable to understanding anti-tobacco media in a number of ways. In Social Cognitive Theory, the person, environment, and behavior are believed to interact and influence each other by a process known as reciprocal determinism (Bandura, 1986). Much like the expectancy value theories discussed above, social cognitive theory postulates that the expected consequences or outcomes of a behavior are major determinants of that behavior (Kohler, Grimley, & Reynolds, 1999). Perceived self-efficacy, or the judgment of one's capability to behave in a way that attains desired outcomes, is another determinant of behavior. Incentives and motivators can also be determinants of behavior according to social cognitive theory. Social cognitive theory suggests that there are four major components that should be included when developing a health promotion program: an information component to increase knowledge of health risks; providing means to change and teaching of skills to use in initiating preventive action; building of self efficacy; and social support to address the environment for change or prevention (Bandura, 1997, as cited in Kohler, Grimley, & Reynolds, 1999). One can extrapolate these components to media messages and suggest that tobacco use prevention messages that increase knowledge while modeling skills in a way that builds self-efficacy and emphasizes social support for anti-tobacco attitudes and behavior would be most effective.

#### *Negative Emotion Theories and Anti-smoking Media Messages*



Although not as thoroughly described or well-defined in the literature as the more established theories presented above, negative emotion theory has also been used to explain the mechanisms by which anti-tobacco advertising can be effective at preventing tobacco use among nonsmokers and increasing quit rates among current smokers. In a meta-analysis of fear-based media appeals, Boster and Mongeau (1984) suggest that increasing fear is associated with increased persuasion. One possible explanation for the effectiveness of emotional statements and images is that people are more likely to act on what they feel physiologically rather than what they think (Hill & Carroll, 2003). In other words, the consequences of smoking are communicated by means of eliciting a negative visceral reaction, which would make one less likely to initiate smoking or more likely to stop smoking. A fear-induced reaction can be thought of in terms of an orienting response (Pavlov, 1927). Lynn (1996) states that when an orienting response occurs, the individual's sensory receptors are drawn to the stimulus that had caused the response, and a subsequent set of physiological responses occur in company to the behavioral response. Some such responses include vasodilatation of blood vessels, decrease in alpha frequency of the EEG, decrease in heart rate, increases in SC and skin temperature and general vasoconstriction of the blood vessels to the major muscle groups (Lynn, 1996).

Orienting responses measured while individuals were watching television have shown the following associated physiologic responses: (a) decreases in heart rate beginning immediately after the appearance of the orienting stimulus and lasting approximately four to six seconds (Campbell, Wood & McBride, 1997; Graham & Clifton, 1966; Lang, 1990), (b) a brief 1-2 second increase in SC (Kimmel et al., 1979),



and (c) an alpha blocking in the EEG (Reeves et al., 1985). Thus, the appearance of a stimulus that elicits an orienting response from an individual while watching television (Ohman, 1979; 1997) results in an observable physiological response.

*Learning Principles Underlying Negative Emotion Theory.* The negative emotion theory of anti-smoking advertisements relies on principles of conditioning theories (e.g., Pavlov, 1927). Pavlov initially conducted studies on animals and found that after a number of trials in which a neutral stimulus that initially did not elicit a response is paired with a stimulus that elicited the response and becomes conditioned so that the presentation of the neutral stimulus alone elicits the response (Pavlov, 1927). In behavioral terms, a conditioned stimulus (CS) is a previously neutral stimulus which is paired with an eliciting stimulus. The unconditioned stimulus (UCS) is a natural eliciting stimulus. The conditioned response (CR) is the response elicited by the CS. The unconditioned response (UR) is the reflexive response elicited by the unconditioned stimulus (Pavlov, 1927).

Various types of CRs can be applied to a wide range of human behavior (Miltnerberger, 2004). For example, one type of CR is that of conditioned emotional responses (e.g., Watson & Rayner, 1920). Though there are numerous methodologies, one way in which researchers might examine correlates of emotion is that of skin conductance responses (SCRs). For example, a researcher might pair a tone (UCS) with a shock (US) which initially resulted in an increase in SCRs (UR) only when the shock is administered. With enough trial pairings of the shock and tone, an increase in SCRs (now, the CR) with the tone alone (now, the CS) will likely occur.

There are several other principles from classical conditioning that are important to discussions of the effectiveness of anti-smoking media. First, stimulus generalization occurs when an organism responds similarly to stimuli in the environment that are similar to that of the original CS. For example, after viewing anti-smoking advertisements that elicit a disgust response, a smoker may have a fear and/or a disgust response when exposed to some aspect of cigarette smoking. Next, stimulus discrimination falls on the other end of the spectrum. This occurs when an organism can detect differences between similar stimuli. In other words, it is the ability to discriminate between the actual CS and some other similar stimulus. Last, extinction occurs when a CS occurs repeatedly in the absence of the US and the CR decreases and may eventually disappear. In other words, it is the repeated presentation of the CS without pairing the US. For example, an individual that has learned to associate fear and/or disgust with smoking stimuli by being exposed to anti-smoking media may no longer have a disgust response (i.e., the response extinguishes) to smoking stimuli if their exposure to the media pairing smoking with fear and/or disgust ceases. Despite such extinction, spontaneous recovery can occur and the behavior can reemerge in the context of the CS. In other words, this is the reemergence of a previously extinguished CR. Although physiological aspects of learning will be discussed below, it should be noted that Pavlov did describe forms of conditioning in terms of an orienting response that occurs as an automatic physiological or behavioral response that occurs in response to novel or signal stimuli (Pavlov, 1927).

Early advertising research has its roots in classical conditioning (e.g., Watson, 1936). Classical conditioning theory and its principles continue to form the basis of present day advertising strategies (Petty & Cacioppo, 1981). Classical conditioning



theory in antismoking advertisement research suggests that it is important to create an association between cigarette smoking and negative emotions by pairing cigarette smoking or the tobacco industry practices with unpleasant images eliciting negative emotions (e.g., Biener, McCallum-Keeler, & Nyman, 2000). Unfortunately, these studies do not differentiate between generally fearful ads and ads that are fearful *and* include a biologically based disgust response of disgust. Lang (2000) takes an information processing approach to learning and television messages. She described encoding as an ongoing process of encoding the message into working memory. Lang and colleagues suggest that there are two types of information that are most likely to be selected for encoding to working memory: information relevant to the goals of the individual as well as information that is novel, unexpected, or representative of change in the environment. According to classical learning theory, in the event of activation of a given situation, or emotion in a given situation, there are collections of memories and physiological responses that should be elicited based on association (Lang, 2000).

There are also new theories rooted in conditioning theory. For example, some learning theories (e.g., Hull, 1943; Estes, 1958), suggest that motivational (drive) states have associated internal drive stimuli that enter into, and are activated by, stimulus-response associations. One's ability to cope with a threat can reduce or raise the emotional activation caused by an initial threat (Lazarus, 1966). Bower (1991) describes various physiological reactions one may have to a threatening stimulus or environmental signal: startle responses to an imminent threat; orienting (e.g., pausing to listen and focus intently, and possibly running away or fighting); an action plan after the initial responses occur (appropriate to the motive or emotion). Bower (1991) suggests that fear responses



result in retrieval of plans for avoiding danger and minimizing threat and escaping harm. Other researchers suggest that disgust paired with fear responses result stronger conditioning and that avoidance of the stimulus occurs (Olatunji & Sawchuk, 2005). In the context of advertising, this is consistent with antismoking research finding that fearful ads paired with disgust, or an “ugh” response as some researchers refer to it, are particularly effective. In other words, individuals viewing disgusting stimuli paired with cigarette smoking may be more likely to subsequently avoid smoking behavior. The argument for biologically based conditioning of disgust is perhaps most strongly supported by LeDoux (2007), who suggests that a stimulus eliciting a response from the lateral nucleus of the amygdala results in strong conditioning.

The reviewed theories are applicable to both fear and biologically based disgust responses. Nonetheless, the role of these emotions in antismoking advertisements is not fully understood. How and why might advertisements that elicit both fear and disgust rather than just fear be more effective? The disgust response can involve one’s physiological reactions to disgusting stimuli, as well as avoidance due to the cognitive appraisal of the response (e.g., concerns of disease acquisition; Angyal, 1941; Rozin & Fallon, 1987). Moreover, conditioned disgust responses have been shown to be among the strongest emotionally conditioned responses (Nemeroff & Rozin, 1994). Conditioned disgust responses have also been shown to be influential in the thought and attitude change, which ultimately results in behavior change (Olatunji & Sawchuk, 2005). Some researchers have taken the first steps in applying this theory to cigarette smoking. For example, Rozin & Singh (1999) found that disgust reactions to smoking were related to attitude about smoking behavior. Moreover, they found that disgust measures were more

strongly correlated with judgments about smoking than were general smoking-related health concerns. In general, it appears that stimuli that elicit biologically-based arousal responses (i.e., disgust) appear to be stored much better than stimuli that do not elicit emotion (Bradley, Greenwald, Petry, & Lang, 1992; Christianson, 1992; Lang, Dhillon, & Dong, 1995; Reeves, Newhagen, Maibach, Basil, & Kurz, 1991; Thorson & Friestand, 1989).

### *Conclusions*

Research indicates that antismoking advertisements that elicit fear appear to be more effective than others at changing smoking attitudes, beliefs, and possibly behaviors. Several researchers, most notably Wakefield et al. (2006; 2003) and Vogeltanz-Holm et al. (2007), have asserted that fearful ads that elicit biologically based arousal by means of disgust are more effective. Or, as Wakefield et al. (2006; 2003) refer to the disgust component, the “ugh” response. This assertion was initially tested in a study that revealed a relationship between physiological arousal and the perceived effectiveness of anti-smoking advertisements (Goetz et al., 2007). Nonetheless, the study could not delineate which aspect of antismoking ads is most impacting. Are ads that elicit fearful responses more effective or less effective than ads eliciting fear *and* disgust responses?

*Fear* ads are those that depict the health and/or social consequences of smoking as a means to make individuals fearful. *Fear with disgust* ads are those that communicate health and/or social consequences of smoking but also elicit a negative visceral reaction.

Despite general agreement regarding the perceived effectiveness of fearful and disgusting anti-smoking media, more controlled research is needed to carefully examine the most effective components (i.e., fear-only versus fear with disgust) of anti-smoking



media and the mechanisms by which these media influence and alter smoking behavior. In addition, virtually all of the applicable research regarding anti-smoking media effectiveness has relied on study participants' self-reports. Few studies have examined these factors with sufficient specificity and/or experimental control to adequately address their relationships to the effectiveness of anti-smoking media and to increase our understanding of mechanisms by which such media might prevent and/or reduce smoking.

#### *Proposed Study*

The proposed research will use methodology adapted from Wakefield et al. (2002, 2003) and Goetz et al. (2007) to examine participants' responses to anti-smoking advertisements. The current study will increase our understanding of the comparative effectiveness of anti-smoking ads eliciting fear and disgust responses in young adults who are current smokers. Differentiating ads eliciting a fear response in the absence of a disgust response from those eliciting both fear and disgust will be an important next step in increasing our understanding of how negative emotion is associated with the effectiveness of anti-tobacco media messages. Effectiveness will be examined by measuring smoking behavior over a brief time period as well as participants' self-reported and psychophysiological responses (i.e., SC, heart rate, & blood pressure) while they are viewing anti-smoking ads. These psychophysiological responses have been shown to be effective tools in advertising research (Hall, 2004).

Based on previous research and theory, there are several hypotheses of interest. First, as a manipulation check, it is hypothesized that there will be a significant difference between participants' ratings of disgust levels between the two groups of advertisements



in that the advertisements high in both fear and disgust will be rated as more disgusting than advertisements with only a fear component. Next, participants viewing the antismoking ads that are high in both fear and disgust characteristics will have greater subjective and physiological arousal responses compared to participants who view antismoking ads that are high in fear but not in disgust characteristics. At two-week follow-up, participants who viewed ads high in fear and disgust will have better recalled, discussed with others, and thought about more than participants who viewed the fear-only ads. Last, it is hypothesized that participants who view the ads with fear and disgust will report more quit attempts, having smoked less cigarettes, and a greater readiness to quit smoking than those participants who viewed the fear-only ads.

## CHAPTER TWO

### METHOD

#### *Participants*

Participants ( $N=81$ ) included young adult current smokers aged 18 to 25 years from a Midwestern university. Current smokers are defined as those persons who report smoking at least once in the past 30 days (e.g., Biener, 2002). A power analysis was conducted using the GPOWER program (e.g., Faul, et al., 2007) and indicated that for the planned analysis requiring the most participants, 55 participants is sufficient to detect a medium effect size ( $f=.25$ ) and power of .8 (i.e., 80% of the time it is present). A medium effect size is a standard effect size to indicate adequate differences between conditions (Myers & Well, 2003). Moreover, this has been shown to be sufficient in similar studies (e.g., Goetz et al., 2007). The participants included female smokers ( $n=47$ ) and male smokers ( $n=34$ ). Participants' self-identified racial/ethnic backgrounds included the following: White ( $n=77$ ) and Asian ( $n=4$ ). The mean age for participants was 20.01 years. Upon completion of the study, all participants had the opportunity to choose between receiving extra credit in undergraduate psychology classes (3 hours of credit) or \$20 compensation. There was some attrition for the follow-up ( $N=8$ ) portion of the study. Moreover, 20 participants' data could not be used because the heart rate and skin conductance (SC) responses were lost due to equipment use error. A sufficient number of participants' data ( $N=61$ ) were available for these analyses using heart rate and SC.

## Measures

*Smoking Status, Attitudes, and Demographic Questionnaire.* This questionnaire (see Appendix C) assessed the following smoking-related variables combined from Wakefield et al. (2003), Clemmey et al. (1997), and Fagerstrom (1991): smoking history (i.e., age first began smoking, age began daily smoking), current smoking exposure (i.e., number of cigarettes smoked/day and if living with another smoker), tobacco dependence (Fagerstrom, 1978; Heatherton, Kozlowski, Frecker & Fagerstrom, 1991), quitting history (number of quitting attempts, if formal treatment was sought, last quit attempt), health risk perception (overall and personalized risk perception), reasons for quitting (Curry et al., 1990), quitting motivation/plans, and quitting self-efficacy (i.e., rating of confidence to quit). Participants were eligible only if they have reported smoking at least once in the past 30 days (e.g., Biener, 2002).

Formal scales included within the *Smoking Status, Attitudes, and Demographic Questionnaire* includes the *Fagerstrom Nicotine Tolerance Questionnaire* (FNTQ; Fagerstrom, 1978), *The Contemplation Ladder* (CL; Biener and Abrams, 1991), and the *Reasons for Quitting* (RFQ) scale (Curry et al., 1990). This questionnaire asked participants to identify their age and ethnicity. The above-mentioned scales are discussed in greater detail below.

*Fagerstrom Nicotine Tolerance Questionnaire.* The FNTQ (Heatherton et al., 1991) is a six-item measure used to assess level of nicotine dependence. The items for the FNTQ were integrated into the longer smoking assessment questionnaire. This scale is widely used to assess degree of tobacco dependence (e.g., Heatherton et al., 1991). According to Heatherton et al. (1991), the FNTQ has acceptable levels of internal



consistency (coefficient  $\alpha = .61$ ) and is closely related to biochemical indices (e.g., CO, salivary cotinine) of heaviness of smoking. Each item is weighted and then summed (Heatherton et al., 1991). Overall, nicotine dependence levels are associated with the following FNTQ scores: 0 to 3 = low dependence; 4 to 6 = medium dependence; and 7 to 10 = high dependence.

*The Contemplation Ladder.* The CL (Biener & Abrams, 1991) was administered to determine participant stage of change based on stage of motivation from Miller and Rollnick (1991). This is a single-item scale which contains 11 anchors (0-10) assessing participant readiness to quit (e.g., "Please rate how ready you are to quit smoking.", 0 = no thought at all, 2 = I think I need to consider quitting someday, 5 = Think I should quit or cut down but not quite ready, 8 = Starting to think about how to change my smoking patterns, 10 = Taking action to quit or cut down (e.g., cutting down, enrolling in a program). Biener and Abrams (1991) found that CL scores are significantly associated with reported intention to quit, number of previous quit attempts, perceived co-worker encouragement to quit, and socioeconomic status. Previous studies have found community samples to have a mean score of 5.14 (95% confidence interval: 4.78, 5.50) and clinic samples seeking services at 9.83 (95% confidence interval: 9.65, 10.00).

*Reasons for Quitting.* The RFQ consists of 20 items, which are scored on four dimensions of motivation to quit: two intrinsic dimensions ("health concerns" and "desire for control") and two extrinsic dimensions ("immediate reinforcement" and "social influence"). The four dimensions have adequate internal consistency (Cronbach's  $\alpha$  ranging from 0.53 to 0.81) and adequate convergent, predictive, and discriminate validity (Curry et al., 1990).

*Smoking Advertisement Background Questionnaire.* Participants also answered questions borrowed from the Monitoring The Future (MTF) study. These questions have been successfully used in a number of previous other studies examining anti-smoking media effectiveness (e.g., Goetz, et al., 2007; Wakefield, 2003). These questions assessed participants' recent exposure to previous anti-smoking advertisements on television and radio as well as in newspapers, magazines and billboards. Additionally, these questions asked about the perceived effectiveness of previous advertisements on attitude and behavior change (e.g., "To what extent do you think such ads on TV, radio, billboards or in magazines and newspapers have made you less favorable toward smoking cigarettes?", 1 = not at all, 5 = to a very great extent). Please see Appendix D for a full listing of items.

*Advertisement-rating forms.* Using a consumer-based strategy derived from commercial advertising and health communication (Sutton, Balch & Lefebvre, 1995; as cited in Wakefield et al., 2002), participants were asked to answer various MTF questions have been successfully used in a number of previous other studies examining anti-smoking media effectiveness (e.g., Goetz et al., 2007; Wakefield, 2003). There were two open-ended questions ("What is the main point that this ad is trying to make?" and "What else is it trying to say?") for which participants' responses was used to code whether the participant understood the advertisement. Then, several five-point likert-scale questions assessed participants' cognitive evaluations, emotive responses, and visceral reactions to each advertisement (e.g., "This ad made me feel disgusted.", 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Disagree nor agree, 4 = Agree, 5 = Strongly Agree). Eight questions assessed participants' cognitive evaluations of the advertisement (e.g., "This ad



had a message that was important to me.”). Five questions assessed participants’ emotive responses to the advertisements (e.g., “This ad made me feel sad.”, “This ad made me feel fearful.”, “This ad made me feel disgusted.”). Two additional questions assessed unpleasant and arousing responses to the advertisements (i.e., “Overall, how unpleasant was this ad?” “Overall, how emotionally arousing was this ad?”). The questionnaire also included one likert-type scale question and one open-ended question that assessed participants’ opinions about how good each advertisement is and why. Participants were then asked whether or not they have seen the advertisement prior to their participation in this study. After answering the above questions for each advertisement, participants were asked to indicate which ad most made them “stop and think.” Please see Appendix E for a listing of all questionnaire items.

*Physiological measures.* SC and heart rate were measured using a Biopac Systems MP150 hardware and Biopac version 3.7.2 analysis software. Heart rate was measured using a blood volume pulse amplitude (BVPA) sensor, which was attached to the participant’s finger. The BVPA sensor obtains a heart rate signal through measure blood volume as blood passes through the finger. This method of collecting heart rate data is less invasive than ECG; however, it was still shown to be an accurate physiological measure (e.g., Andreasi, 2000). Heart rate was measured as the average number of beats per minute during specific time periods (e.g., from the beginning to end of an advertisement). These time periods are discussed thoroughly within the *Procedures* section.

Phasic and tonic measures of SC were also be measured during specific time periods (i.e., mean tonic level, or skin conductance level, and number of skin



conductance responses, or SCRs). SC is a more direct measure of sympathetic nervous system activity than heart rate. The method that was used in this study to detect the incidence of SCR is suggested by Kim, Bang, & Kim (2004). Consecutive zero-crossings, from positive to negative and negative to positive, were used to detect SCRs. The amplitude of the SCR was obtained by finding the maximum value between the two zero-crossings. Detected SCRs with an amplitude smaller than 10% of the maximum SCR amplitude in the specified time segment was excluded. Thus, the highly variable contextual information influencing the level of SCR amplitude can be taken into consideration. This method eliminated the need for the researcher to visually determine the threshold level and thus, a more objective analysis was performed (Kim et al., 2004).

Finally, blood pressure was measured using Dinamap PRO Monitoring Systems Hardware. Blood pressure is considered to be a measure of baroreceptor activity. Systolic and diastolic blood pressure were measured after the viewing of each advertisement including the practice ad (i.e., a total of six times for which the first measurement provided a baseline).

*Follow-up questionnaire.* To determine if particular advertisements were likely to influence smoking prevalence the study also assessed if participants remember having seen the advertisements and if the information they remember has an impact after a two-week period. Thus, the following outcome variables were examined: engagement (i.e., measurements of ad recall, having thought about the ad, and having discussed the ad with others) and appraisal (which ad stood out). In this interview-format questionnaire, which was delivered over the telephone, participants were asked to recall all ads from the initial rating session. In order for the ad to be counted as having been recalled, the

participant had to describe the major point and events of the ad. They were then asked to indicate which ad stood out most. For each ad recalled, participants were asked if they thought about anything specific in the ad or if they discussed the ad with anyone since the rating session. The questionnaire also assessed exposure to the advertisements since the last rating session. Lastly, the questionnaire assessed smoking-related variables that were first measured in the laboratory (i.e., current smoking exposure, tobacco dependence, quit attempts, health risk perception, reasons for quitting if an attempt occurred, quitting motivation/plans, and quitting self-efficacy if quitting smoking is desired). Please see Appendix F for full listing of follow-up items and the interview procedure.

*Media advertising stimuli.* Ten anti-smoking media advertisements that have been found to elicit fearful ratings (*Krystell Memorial*, *Still Can't Quit*, *Treatment*, *Echo*, *Before and After*) or a fearful and disgust response (*Artery*, *Lung*, *Older Than Dead*, *Brain*, *Voicebox - Industry*) from participants. Additionally, one neutral advertisement for a credit card was used as a practice ad to ensure participants understand the procedure (e.g., Wakefield et al., 2002; 2003). These ads were selected based on pilot data with the goal of selecting ads with little variation in fear ratings across both sets of ads and a significant amount of variation between the two sets of ads on disgust ratings. Moreover *Artery*, *Lung*, and *Brain*, were found to be effective advertisements in previous studies (e.g., Donovan, et al., 2003). Vogeltanz-Holm, et al. (2005) and Goetz et al. (2007) found such ads that have graphic physical harm warnings as effective. Such methodology attempts to more specifically examine the negative visceral response previously described, though not measured behaviorally, in the anti-smoking advertisement literature (e.g., Wakefield et al., 2003). See Appendix B for a full



description of the advertisements including the agency sponsoring the development of the ad, the year in which it was created, and pilot data with mean fear and disgust ratings. Upon presentation of the ads, sponsor identifications were removed for participants' viewing.

### *Procedure*

Participants were recruited for participation through undergraduate psychology classes and by posting notices in public places around the university and town. Upon arrival to the lab, participants were seated in front of a computer at a desk. They were informed of the experimental procedure and told that the purpose of the study is to examine physical and self-reported responses to anti-smoking advertisements. At this time, they were asked to read and sign a consent form (see Appendix A). If willing to participate, they were asked to wash their hands (for accuracy of SCR measurement) in a separate room and they were randomly assigned to either view the ads that have been rated as highly disgusting or those that have been rated as less disgusting. A packet of questionnaires were placed next to the participants' dominant hand. Participants first completed the *Smoking Status, Attitudes, and Demographic Questionnaire* and then the *Smoking Advertisement Background Questionnaire*. Psychophysiological equipment as then attached to the participant. A photoplethysmograph (BPPA sensor to measure pulse) were placed on the first finger of the non-dominant hand and silver/silver chloride electrodes were attached to the medial phalanx of the second and third fingers (to measure SC) of the participant's non-dominant hand. A blood pressure cuff were also be fitted to the participant's non-dominant arm.



Then, following a five-minute adaptation period and a three-minute baseline measure of SC, heart rate, and a blood pressure measurement, participants viewed a practice advertisement twice and fill out a practice *Advertisement Rating Form* to ensure that they understand the procedure. There was then a three-minute recovery period before the participant views the first anti-smoking advertisement. Participants viewed an advertisement twice before rating it using the *Advertisement Rating Form*. A three-minute recovery period always occurred between the time in which a participant completes a rating form and the viewing of the next advertisement. The five anti-smoking advertisements were presented to participants in a randomly-determined order. At the end of the initial session, the experimenter then obtained participant information so the participant can be contacted for a 20-minute, standardized telephone follow-up interview two weeks later. Upon completion of the follow-up interview, participants were debriefed and receive course credit or financial compensation. This procedure is consistent with that of Goetz et al. (2007).

### *Data Analysis*

In the following analyses, *Ad Type* (fear with disgust versus fear-only) was a between-subject factor while *Advertisement* (the five different ads), and *Time* (baseline, 1<sup>st</sup> exposure to the ad, and 2<sup>nd</sup> exposure to the ad) were within-subject factors. In addition, the number of cigarettes smoked per day at the initial assessment was intended to be used as a linear covariate.

*Descriptive Analyses.* Descriptive analyses were performed on the demographic and smoking variables for the total sample and for the two experimental groups (Fear

with Disgust vs. Fear-only). Chi-square tests and t-tests were conducted to determine whether any demographic differences existed between the two experimental groups.

*Self-Report Laboratory data.* These analyses were designed to determine whether fear and disgust ratings were affected by Ad Type or the interaction of Ad Type by Advertisement controlling for cigarettes smoked per day. Preliminary linear mixed model analyses were conducted to ensure that the covariate did not interact with Ad Type or with Ad Type and Advertisement. If either of these interactions were statistically significant then cigarettes smoked per day was transformed into a fixed factor using a mean split of the raw data and this fixed factor was included as a main effect in the subsequent primary analyses and allowed to interact with Ad Type and Ad Type and Advertisement. If neither interaction in the preliminary analyses was statistically significant then primary analyses proceeded as intended with cigarettes smoked per day as a linear covariate in the design. Significant effects from primary analyses were followed-up with tests of simple effects and/or least square difference tests as appropriate.

*Psychophysiological Laboratory Data.* These analyses were designed to determine whether changes in heart rate, blood pressure, and SC from baseline through ad viewing periods (Time) were affected by Ad Type or the interaction of Ad Type and Advertisement controlling for cigarettes smoked per day. Preliminary linear mixed model analyses were conducted to ensure that the covariate did not interact with Ad Type, Time, Ad Type by Advertisement, Ad Type by Time, and Ad Type by Time by Advertisement. If any of these interactions were statistically significant then cigarettes smoked per day was transformed into a fixed factor using a mean split of the raw data



and this fixed factor was included as a main effect in the subsequent primary analyses and allowed to interact with Ad Type, Time, Ad Type by Advertisement, Ad Type by Time, and Ad Type by Time by Advertisement. If none of the interactions in these preliminary analyses were statistically significant then the main analyses proceeded as intended with cigarettes smoked per day as a linear covariate in the design. Significant effects in all primary analyses were followed-up with tests of simple effects and/or least square difference tests as appropriate.

*Follow-up Analyses.* To compare differences in ad recall, ad saliency, and engagement (i.e., percent of participants reporting having discussed the ad and percent reporting having thought about the ad), Complex Samples in SPSS 16.0 was used to estimate and parameter estimates with associated 95% confidence intervals. Group differences in ad type (i.e., fear with disgust ads versus fear-only ads) were examined. To compare differences within ad types for ad recall, most salient, thought about, and discussed, Z-tests for proportions between ads and pairs of ads were used.

#### *Analyses of Smokers' Readiness to Quit Across Time*

A mixed-design 2 (*Ad Type*) by 3 (*Time*) ANCOVA was conducted on participant responses to the *Contemplation Ladder* question before viewing the advertisements, after viewing the advertisements, and at the follow-up interview. The number of cigarettes smoked per day in the two weeks prior to the laboratory session was used as a covariate.

*Smoking Behavior Analyses.* A one-way ANCOVA on *Ad Type* (Fear with Disgust ads versus Fear-only ads) with the dependent variable being the number of cigarettes smoked in the past two weeks prior to the follow-up interview and the covariate being the number of cigarettes smoked per day the two weeks before the



laboratory session were conducted to examine changes in actual smoking behavior. Last, a chi-square analysis examining the effect of Ad Type (Fear with Disgust ads versus Fear-only ads) on Quit Attempts was performed with the covariate being the number of cigarettes smoked per day the two weeks before the laboratory session.

## CHAPTER THREE

### RESULTS

#### *Participants*

Participants ( $N=81$ ) included young adult current smokers aged 18 to 25 years ( $M=20.01$  years,  $SD=2.42$ ). The majority of participants were White (95.1%) and female (58%). All participants reported having smoked at least once in the past thirty days and 80.5% of participants reported having smoked at least 100 cigarettes in their lifetime. Table 1 shows these and additional data for the overall sample and separately for the participants viewing the Fear with Disgust ads and those viewing the Fear-only ads. There were no significant differences between the experimental (ad) groups on any of the variables shown in table 1 with the exception of the number of cigarettes smoked per day. A one-way ANOVA on Ad Type (Fear with Disgust ads versus Fear-only ads) showed that participants in the Fear with Disgust ad condition reported smoking significantly more cigarettes per day than participants in the Fear-only ad condition [ $F(1, 79) = 4.40$ ,  $p<.05$ ]. A one-way ANOVA on Ad Type showed no significant differences between the conditions for cigarette dependence level on the Fagerstrom ( $p>.05$ ).

Table 1. Participant Descriptive Data.

	Ad Type					
	Fear-only Condition		Fear with Disgust Condition		Overall	
	Mean (SD)	% (n)	Mean (SD)	% (n)	Mean (SD)	% (n)
Age	19.81(1.73)		20.23(3.00)		20.01 (2.42)	
Sex						
Female		57.1(24)		59.0(23)		47(58)
Male		42.9(18)		41.0(16)		34(42)
Ethnicity						
White		95.2(40)		94.59 (37)		93.9(77)
Asian		4.8(2)		5.1(2)		4.9(4)
Smoking Behavior						
Past 30 days		100(42)		100(39)		100(81)
100 or more		81.0(34)		82.1 (32)		80.5(66)
Cig per day <sup>1</sup>	2.77(3.25)		5.18(6.62)		3.92(5.24)	
Fagerstrom Score	.63(1.13)		1.37(2.12)		.97(1.69)	

<sup>1</sup> Statistically significant ( $p < .05$ ) difference between fear with disgust and fear-only experimental conditions.

### Self-Report Analyses

**Fear Ratings.** Initial linear mixed model analysis showed significant interactions between the proposed covariate (Smoking Level) and the fixed factor, Ad Type. Therefore, as described in the Data Analysis section of the Method, a 2 (Ad Type) X 2 (Smoking Level) X 5 (Advertisement) linear mixed model analysis was conducted on mean fear ratings. This analysis tested the significant main effects of Ad Type and Smoking Level as well as the interactions of Ad Type by Smoking Level, Ad Type by Advertisement, and Ad Type by Smoking Level by Advertisement. Results showed a significant Ad Type (i.e., Fear-only versus Fear with Disgust) by Smoking Level (Low Smokers versus Moderate smokers) interaction [ $F(1, 372.26) = 8.08, p < .01$ ]. No main effects nor any other interactions were statistically significant ( $p > .1$ ). Figure 1 presents



the Ad Type by Smoking Level interaction for fear ratings. Table 2 presents the mean fear rating scores for each ad.

Table 2. Mean Fear Rating Scores of Antismoking Ads.

	Fear Ratings	n		Fear Ratings	n
Fear-Only Ads			Fear with Disgust Ads		
<i>Echo</i>	3.17 (1.16)	41	<i>Artery</i>	3.31 (1.22)	39
<i>Still Can't Quit</i>	3.38 (1.28)	40	<i>Lung</i>	3.08 (1.04)	39
<i>Krystell</i>			<i>Older than</i>		
<i>Memorial</i>	2.98 (1.21)	41	<i>Dead</i>	2.82 (1.28)	39
<i>Before and After</i>	2.93 (1.25)	41	<i>Brain</i>	3.08 (1.22)	39
<i>Treatment</i>	3.20 (1.23)	41	<i>Voicebox</i>	3.05 (1.23)	39
Average of All 5 Ads	3.12 (.97)	41	Average of All 5 Ads	3.07 (1.02)	39

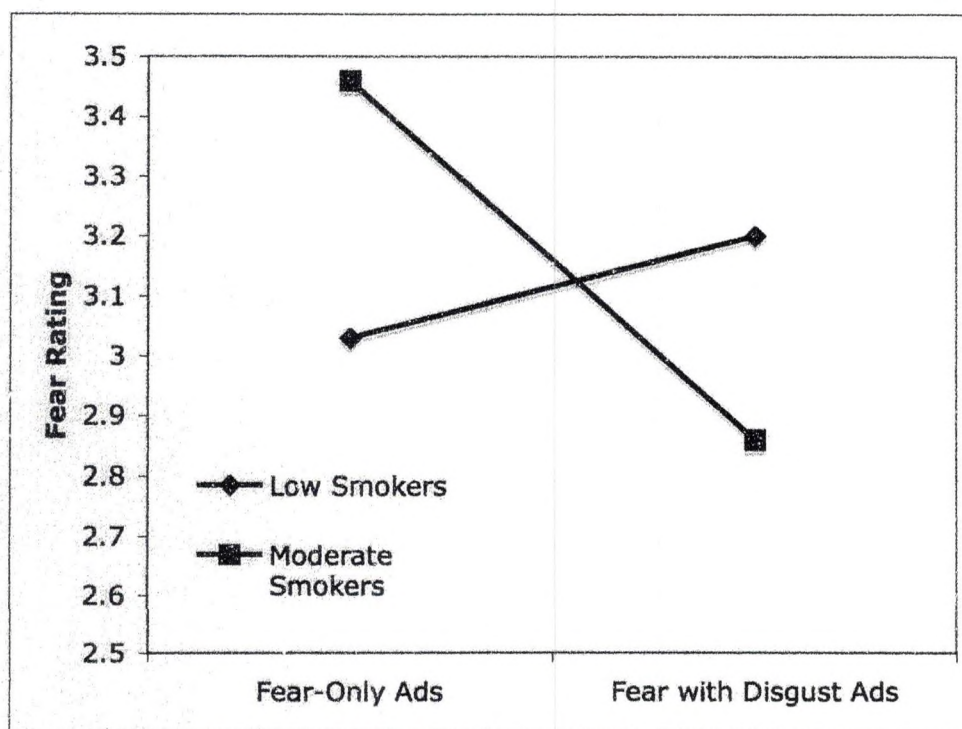


Figure 1. Participants' Mean Fear Ratings for the Ad Type by Smoking Level Interaction.

Tests of simple effects were used to follow-up the statistically significant Ad Type by Smoking Level interaction. These tests examined Smoking Level effects within each level of Ad Type and then Ad Type effects within each Smoking Level finding significant effects of Smoking Level within the Fear-only ads [ $F(1,200.78)=4.66, p<.05$ ] and Ad Type within Moderate Smoking level [ $F(1,102.85)=7.34, p<.01$ ]. Moderate Smoking participants who viewed the Fear-only ads ( $M=3.46, SE=.17$ ) had higher fear ratings than did Moderate Smoking participants who viewed the Fear with Disgust ads ( $M=2.86, SE=.14$ ). In addition, participants in the Moderate Smoking group ( $M=3.44, SE=.17$ ) had greater fear ratings than did participants in the Low Smoking group ( $M=3.02, SE=.10$ ) after viewing the Fear-only ads.

Disgust Ratings. As in the analyses of fear ratings, initial linear mixed model analysis of disgust ratings showed significant interactions between the proposed covariate (Smoking Level) and the fixed factor, Ad Type. Therefore, the same analytic design and procedure was used for disgust ratings as had been used with fear ratings. This analysis revealed a statistically significant main effect for Ad Type [ $F(1, 368.28) = 12.97, p<.001$ ], an interaction between Ad Type and Smoking Level [ $F(1, 368.28) = 14.05, p<.001$ ], and an interaction between Ad Type and Advertisement [ $F(8, 132.18) = 2.4, p<.01$ ]. No other main effects or interactions were statistically significant ( $p > .1$ ). The means for the main effect for Ad Type showed that participants viewing the Fear with Disgust Ads ( $M=3.43, SE=.09$ ) had higher ratings of disgust than did those viewing the Fear-only ads ( $M=2.95, SE=.10$ ). Figure 2 presents the Ad Type by Smoking Level interaction for the disgust ratings. Table 3 presents the mean disgust rating scores for each ad.

Table 3. Mean Disgust Rating Scores of Antismoking Ads.

	Disgust Ratings	n		Disgust Ratings	n
Fear-only Ads			Fear with Disgust Ads		
<i>Echo</i>	2.76 (1.2)	41	<i>Artery</i>	4.03 (1.11)	39
<i>Still Can't Quit</i>	2.93 (1.16)	40	<i>Lung</i>	3.08 (1.40)	39
<i>Krystell</i>			<i>Older than</i>		
<i>Memorial</i>	3.22 (1.06)	41	<i>Dead</i>	3.28 (1.33)	39
<i>Before and</i>					
<i>After</i>	2.44 (1.18)	41	<i>Brain</i>	3.54 (1.30)	39
<i>Treatment</i>	2.59 (1.28)	41	<i>Voicebox</i>	3.54 (1.34)	39
Average of All			Average of All		
5 Ads	2.78 (.89)	41	5 Ads	3.49 (1.07)	39

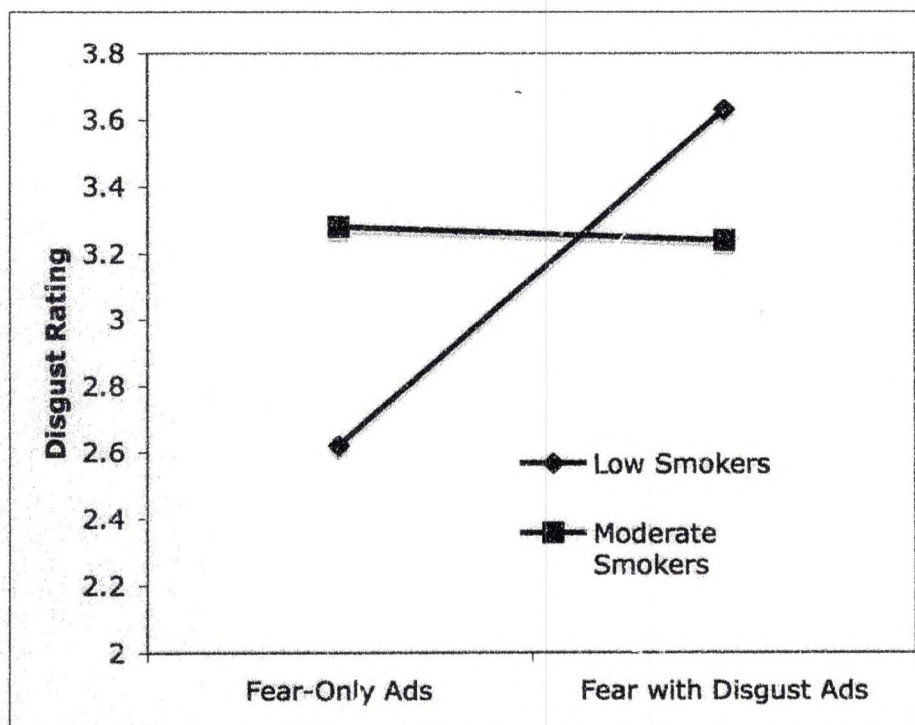


Figure 2. Participants' Mean Disgust Ratings for the Ad Type by Smoking Level Interaction.

Tests of simple effects were used to follow-up the statistically significant Ad Type by Smoking Level interaction. These tests examined Smoking Level effects within each level of Ad Type and then Ad Type effects within each level of Smoking Level.



These tests showed significant effects of Smoking Level within the Fear-only ads [ $F(1, 199.41) = 11.76, p < .01$ ] and Ad Type within the Low Smoking level [ $F(1, 261.05) = 53.90, p < .001$ ]. Effects of Smoking Level at the level of Fear with Disgust approached statistical significance [ $F(1, 184.69) = 3.83, p = .05$ ]. First, participants that were in the Low Smoking condition had higher disgust ratings when viewing the Fear with Disgust ads ( $M = 3.67, SE = .11$ ) than when viewing the Fear-only ads ( $M = 2.64, SE = .09$ ). Next, participants in the Moderate Smoking condition rated the Fear-only ads as more disgusting ( $M = 3.29, SE = .17$ ) than did participants in the Low Smoking condition ( $M = 2.64, SE = .09$ ). Though only approaching significance, Fear with Disgust ads were rated by Moderate smokers ( $M = 3.29, SE = .17$ ) as less disgusting than by Low Smokers ( $M = 3.66, SE = .12$ ).

Figure 3 shows the Ad Type by Advertisement interaction on the disgust ratings. Tests of simple effects were also used to follow-up this statistically significant interaction. These tests examined each level of Ad Type for disgust ratings. These tests showed significant differences between each Advertisement within each Ad Type, Fear-only [ $F(4, 70.55) = 2.97, p < .05$ ] and Fear with Disgust [ $F(4, 69.82) = 3.29, p < .05$ ]. Pairwise comparisons of participants' disgust ratings were then examined to follow up these significant simple effects. A Bonferroni correction for multiple comparisons was applied to the analyses revealing that, within the Fear-only ads, the *Krystell-Memorial* ad ( $M = 3.22, SE = .17$ ) had significantly higher disgust ratings than the ad *Before and After* ( $M = 2.44, SE = .19$ ) and the ad *Treatment* ( $M = 2.59, SE = .20$ ). Pairwise comparisons within the Fear with Disgust ads, revealed that the ad *Artery* ( $M = 4.03, SE = .18$ ) had significantly

higher disgust ratings than the ad *Older than Dead* ( $M=3.28$ ,  $SE=.21$ ) and the ad *Lung* ( $M=3.08$ ,  $SD=.23$ ).

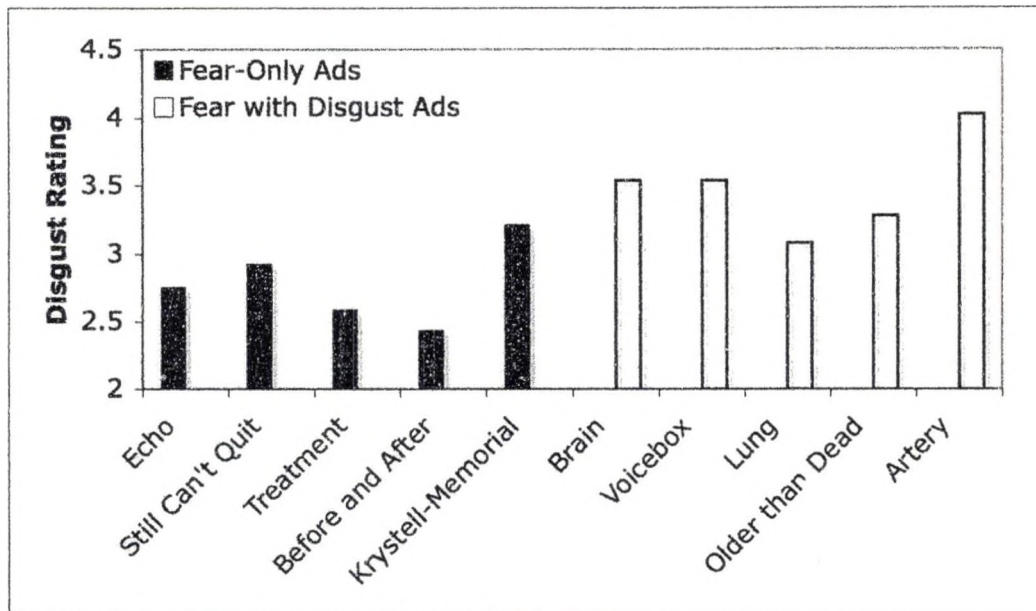


Figure 3. Participants' Mean Disgust Ratings for the Advertisement by Ad Type interaction.

#### *Heart Rate Changes Associated with Viewing Advertisements*

An initial linear mixed model analysis did not show significant interactions between the proposed covariate and any of the fixed factors. Thus, mean heart rate was adjusted for the significant effect of the covariate (i.e., number of cigarettes smoked per week). A 2 (Ad Type) X 5 (Advertisement) X 3 (Time) linear mixed model analysis was conducted on mean heart rate. This analysis tested the significant main effects of Ad Type, Time, and the covariate (smoking level), as well as the interactions of Ad Type by Advertisement, Time by Ad Type, and Ad Type by Advertisement by Time. Results showed a significant main effect of the covariate, number of cigarettes smoked per week [ $F(1, 807.20) = 79.95$ ,  $p<.001$ ]. The parameter estimate for the covariate (.76) indicated a significant trend for participants who smoked more to have higher average heart rate.



This analysis also showed a main effect for Time [ $F(2, 551.20) = 6.01, p < .01$ ]. No other main effects nor any interactions were statistically significant ( $p > .1$ ). To further examine the statistically significant main effect of Time, pairwise comparisons were conducted between each level of time. A Bonferroni correction for multiple comparisons was applied to the analyses. These comparisons revealed that mean heart rate at baseline ( $M=81.79, SE=.66$ ) was significantly higher than at the first presentation of the ads ( $M=78.79, SE=.66$ ). Table 4 presents the mean heart rate of each ad at each time point.

Table 4. Mean Heart Rate During Viewing of Antismoking Advertisements.

	Baseline	1 <sup>st</sup> Presentation of Ad	2 <sup>nd</sup> Presentation of Ad	n
<i>Fear-only Ads</i>				
<i>Echo</i>	82.57 (11.95)	78.28 (9.20)	78.52 (9.36)	30
<i>Still Can't Quit</i>	82.45 (9.94)	80.99 (11.93)	80.46 (9.95)	31
<i>Krystell</i>				
<i>Memorial</i>	82.21 (9.22)	77.77 (8.61)	79.01 (8.92)	30
<i>Before and</i>				
<i>After</i>	81.37 (8.34)	77.61 (8.87)	78.29 (11.01)	30
<i>Treatment</i>	83.29 (10.94)	78.29 (11.01)	79.19 (9.50)	30
<i>Average of All</i>				
<i>5 Ads</i>	82.57 (8.94)	78.86 (7.84)	79.62 (6.90)	32
<i>Fear with Disgust Ads</i>				
<i>Artery</i>	80.97 (12.90)	78.00 (13.00)	78.57 (13.14)	28
<i>Lung</i>	82.64 (13.07)	81.24 (13.08)	81.22 (12.99)	28
<i>Older than</i>				
<i>Dead</i>	80.35 (11.48)	81.04 (12.27)	79.90 (12.95)	28
<i>Brain</i>	81.76 (12.64)	77.80 (12.65)	78.73 (12.43)	29
<i>Voicebox</i>	80.93 (12.97)	77.30 (14.10)	78.09 (14.01)	28
<i>Average of All</i>				
<i>5 Ads</i>	81.58 (12.15)	79.02 (12.17)	79.28 (12.20)	30

*Tonic Skin Conductance Changes Associated with Viewing Advertisements*



Initial linear mixed model analysis showed significant interactions between the proposed covariate (smoking level) and the fixed factor, Ad Type. Therefore, as described in the Data Analysis section of the Method, a 2 (Ad Type) 2 (Smoking Level) X 5 (Advertisement) X 3 (Time) linear mixed model analysis was conducted on participants' tonic skin conductance levels (SCLs). This analysis tested the significant main effects of Ad Type, Time, and Smoking Level as well as the interactions of Ad Type by Advertisement, Ad Type by Time, Ad Type by Smoking Level, Time by Smoking Level, Ad Type by Advertisement by Time, Ad Type by Advertisement by Smoking Level, Ad Type by Time by Smoking Level, and Ad Type by Advertisement by Time by Smoking Level. This analysis showed a significant main effect for Ad Type [ $F(1, 787.30) = 6.43, p < .05$ ]. No other main effects or any interactions were statistically significant ( $p > .1$ ). An examination of the means for Ad Type revealed that participants in the Fear-only condition ( $M = 17.58, SE = .55$ ) had an overall higher mean SCL than did participants in the Fear with Disgust condition ( $M = 15.59, SE = .56$ ). Table 5 presents the mean SCL of each ad at each time point.

Table 5. Mean SCL During Viewing of Antismoking Advertisements.

	Baseline	1 <sup>st</sup> Presentation of Ad	2 <sup>nd</sup> Presentation of Ad	n
Fear-Only Ads				
<i>Echo</i>	17.66(10.85)	18.32 (12.42)	17.22 (11.24)	30
<i>Still Can't Quit</i>	17.85 (10.66)	18.26 (11.44)	16.99 (10.11)	31
<i>Krystell</i>				
<i>Memorial</i>	18.38 (11.12)	19.05 (12.19)	17.86 (11.44)	30
<i>Before and</i>				
<i>After</i>	15.46 (11.04)	18.73 (11.50)	17.39 (10.48)	30
<i>Treatment</i>	17.79 (10.56)	18.70 (12.21)	17.36 (10.92)	30
Average of All				
5 Ads	17.91 (10.20)	19.09 (11.27)	17.70 (10.03)	32
Fear with Disgust Ads				
<i>Artery</i>	15.32 (8.91)	15.98 (10.00)	14.66 (8.63)	28
<i>Lung</i>	15.48 (9.52)	16.16 (10.93)	15.12 (10.65)	28
<i>Older than</i>				
<i>Dead</i>	14.44 (10.04)	15.68 (11.38)	14.55 (10.26)	28
<i>Brain</i>	12.86 (9.60)	16.13 (9.46)	15.16 (8.43)	29
<i>Voicebox</i>	15.80 (9.11)	16.93 (10.96)	16.04 (10.53)	28
Average of All				
5 Ads	15.04 (8.52)	16.32 (9.60)	15.18 (8.65)	30

*Skin Conductance Responses Associated with Viewing Advertisements*

An initial linear mixed model analysis did not show significant interactions between the proposed covariate and any of the fixed factors. Thus, mean skin conductance responses (SCRs) were adjusted for the significant effect of the covariate (i.e., number of cigarettes smoked per week). A 2 (Ad Type) X 5 (Advertisement) X 3 (Time) linear mixed model analysis was conducted on participants' SCRs. This analysis tested the significant main effects of Ad Type, Time, and the covariate, as well as the interactions of Ad Type by Advertisement, Time by Ad Type, and Ad Type by Advertisement by Time. Results showed a significant main effect of the covariate,

number of cigarettes smoked per week [ $F(1, 418.25) = 6.07, p < .05$ ] and a significant main effect of Time [ $F(2, 461.30) = 43.85, p < .001$ ]. The parameter estimate for the covariate (.41) indicated that participants who smoked more had more SCRs. To further examine the significant main effect of Time, pairwise comparisons with Bonferroni corrections were conducted between each level of Time. These comparisons revealed that the mean number of SCRs at baseline ( $M=29.88, SE=2.21$ ) was significantly lower than during the first presentation ( $M=65.75, SE=4.91$ ) and the second presentation ( $M=74.22, SE=5.46$ ) of the ads. Table 6 presents the mean SCRs for each ad at each time point.



Table 6. Mean SCR During Viewing of Antismoking Advertisements.

	Baseline	1 <sup>st</sup> Presentation of Ad	2 <sup>nd</sup> Presentation of Ad	n
Fear-Only Ads				
<i>Echo</i>	21.64 (27.15)	59.59 (72.90)	66.66 (87.01)	30
<i>Still Can't Quit</i>	30.74 (35.59)	63.42 (74.06)	73.62 (88.50)	31
<i>Krystell</i>				
<i>Memorial</i>	27.90 (33.91)	73.33 (96.56)	82.10 (104.38)	30
	44.36 (56.79)			
<i>Before and After</i>		67.93 (82.91)	71.50 (88.34)	30
<i>Treatment</i>	37.07 (42.12)	85.63 (106.56)	101.33 (117.67)	30
Average of All 5 Ads	31.18 (29.78)	68.55 (69.62)	77.18 (79.17)	32
Fear with Disgust Ads				
<i>Artery</i>	24.46 (29.31)	58.14 (71.58)	63.11 (74.77)	28
<i>Lung</i>	21.80 (25.14)	54.79 (67.98)	65.57 (80.59)	28
<i>Older than Dead</i>	27.62 (34.33)	70.21 (95.70)	76.18 (98.01)	28
<i>Brain</i>	29.66 (30.76)	52.17 (56.88)	57.83 (63.85)	29
<i>Voicebox</i>	32.21 (40.42)	72.20 (86.51)	83.98 (102.27)	28
Average of All 5 Ads	26.78 (20.16)	61.61 (58.77)	69.09 (66.20)	30

#### *Blood Pressure Changes Associated with Viewing Advertisements*

Diastolic Blood Pressure. Initial linear mixed model analysis did not show significant interactions between the proposed covariate and any of the fixed factors. Thus, mean blood pressure was adjusted for the significant effect of the covariate (i.e., number of cigarettes smoked per week). A 2 (Ad Type) X 5 (Advertisement) X 2 (Time) linear mixed model analysis was conducted on participants' diastolic blood pressure after having viewed each advertisement two times. This analysis tested for the significant main effects of Ad Type, Time, and the covariate, as well as the interactions of Ad Type

by Advertisement, Ad Type by Time, and Ad Type by Advertisement by Time. Results showed a significant main effect for the covariate, number of cigarettes smoked per week [ $F(1, 739.76) = 39.4, p < .001$ ]. The parameter estimate for the covariate (.34) indicated a significant trend for participants who smoked more to have higher diastolic blood pressure. This analysis also revealed a statistically significant main effect for Ad Type [ $F(1, 742.09) = 13.98, p < .001$ ]. The means for the significant main effect of Ad Type showed that participants in the Fear-only condition ( $M=68.80, SE=.39$ ) had higher diastolic blood pressures averaged across all three assessments (baseline, 1<sup>st</sup> presentation, and 2<sup>nd</sup> presentation) than did participants in the Fear with Disgust condition ( $M=66.67, SE=.40$ ). Table 7 presents the mean systolic blood pressure data.

Table 7. Mean Systolic Blood Pressure After Viewing Antismoking Advertisements.

	Systolic Blood Pressure	n		Systolic Blood Pressure	n
Fear-Only Ads			Fear with Disgust Ads		
	114.93			113.23	
<i>Echo</i>	(12.53)	40	<i>Artery</i>	(12.94)	39
	116.18			114.03	
<i>Still Can't Quit</i>	(13.35)	40	<i>Lung</i>	(14.11)	39
<i>Krystell</i>	115.97		<i>Older than</i>	113.13	
<i>Memorial</i>	(14.00)	39	<i>Dead</i>	(12.48)	39
<i>Before and</i>	114.46			114.29	
<i>After</i>	(11.83)	39	<i>Brain</i>	(12.49)	38
	117.21			113.61	
<i>Treatment</i>	(13.32)	39	<i>Voicebox</i>	(12.37)	38
Average of All	115.75		Average of All	113.66	
5 Ads	(13.00)	39	5 Ads	(12.87)	39

Systolic Blood Pressure. Initial linear mixed model analysis did not show significant interactions between the proposed covariate and any of the fixed factors. Thus, mean systolic blood pressure was adjusted for the significant effect of the covariate



(i.e., number of cigarettes smoked per week). Therefore, the same analytic design and procedure was used for systolic blood pressure as had been used with diastolic blood pressure. No main effects nor any interactions were statistically significant ( $p > .1$ ). Table 8 presents the mean systolic blood pressure data.

Table 8. Mean Diastolic Blood Pressure After Viewing Antismoking Advertisements.

	Diastolic Blood Pressure	n		Diastolic Blood Pressure	n
Fear-Only Ads			Fear with Disgust Ads		
<i>Echo</i>	67.33 (7.67)	40	<i>Artery</i>	66.33 (7.29)	39
<i>Still Can't Quit</i>	68.75 (9.54)	40	<i>Lung</i>	66.74 (8.29)	39
<i>Krystell</i>			<i>Older than</i>		
<i>Memorial</i>	68.05 (8.43)	39	<i>Dead</i>	66.38 (7.56)	39
<i>Before and</i>					
<i>After</i>	68.82 (7.64)	39	<i>Brain</i>	66.74 (8.29)	38
<i>Treatment</i>	68.37 (7.35)	38	<i>Voicebox</i>	67.18 (7.20)	38
Average of All			Average of All		
5 Ads	68.26 (8.20)	41	5 Ads	66.70 (7.23)	39

#### Two-weeks Follow-up Results

Most Recalled Ads. Participants' recall of specific ads at two-weeks follow-up was examined using the Complex Samples Procedure in SPSS 14.0. This procedure provides parameter estimates with associated 95% confidence intervals (see table 9). On average, there were no significant differences in the recall rates of the two types of ads as Fear-only ads were recalled by 52.9% of participants, and Fear with Disgust ads were recalled by 48.3% of participants. Comparisons between individual ads within the two ad types were done using z-tests for proportions. These analyses for ads in the Fear-only condition revealed that *Still Can't Quit* was recalled significantly more often than the ads *Echo* ( $Z=3.57, p<.001$ ) and *Treatment* ( $Z=2.45, p<.05$ ), and that the ads *Krystell* ( $Z=2.35, p<.05$ ) and *Before and After* ( $Z=2.35, p<.05$ ) were recalled



significantly more often than *Echo*. Z-tests for proportions between pairs of ads in the Fear with Disgust ad condition revealed that the ads *Voicebox* and *Artery* were recalled significantly more often than the ads *Brain* and *Older Than Dead* ( $Z=4.24, p<.001$  and  $Z=3.86, p<.001$ , respectively) and significantly more often than the ad *Brain* ( $Z=2.45, p<.05$  and  $Z=2.03, p<.05$ , respectively). In addition, the ad *Lung* was recalled significantly more often than the ad *Older Than Dead* ( $Z=2.32, p<.05$ ).

Table 9. Percent of participants recalling each advertisement.

Ad	Ad Type	
	Fear-only	Fear with Disgust
<i>Echo</i>	29.7% (17.1-46.5)	
<i>Still Can't Quit</i>	73.0% (56.3-85.0)	
<i>Krystell Memorial</i>	59.5% (42.9-74.1)	
<i>Before and After</i>	59.5% (42.9-74.1)	
<i>Treatment</i>	43.2% (28.2-59.7)	
<i>Artery</i>		66.7% (49.6-80.2)
<i>Lung</i>		47.2% (31.4-63.6)
<i>Older than Dead</i>		16.7% (7.6-32.9)
<i>Brain</i>		38.9% (24.3-55.8)
<i>Voicebox</i>		72.2% (55.2-84.6)

Most salient ads. Next, participants' statement of which ad was most salient at the follow-up interview was also examined using the Complex Samples Procedure in SPSS 14.0. This procedure provided parameter estimates with associated 95% confidence intervals (see table 10). Saliency could not be addressed across ad types as all participants were asked to indicate one ad that was most salient; however, comparisons between ads within each Ad Type (Fear-only and Fear with Disgust) revealed some significant differences. In the Fear-only ad condition, *Still Can't Quit* was selected as the

most salient ad more often than *Echo* ( $Z=2.5, p<.05$ ), *Before and After* ( $Z=3.99, p<.001$ ), and *Treatment* ( $Z=4.66, p<.001$ ). In addition, *Krystell Memorial* was selected as the most salient ad more often than *Before and After* ( $Z=2.54, p<.05$ ) and *Treatment* ( $Z=3.35, p<.01$ ). In the Fear with Disgust ad condition, *Voicebox* was selected as the most salient ad more often than *Brain, Lung, and Older Than Dead* ( $Z=3.0, p<.01$ ;  $Z=3.79, p<.001$ ;  $Z=4.17$  and  $p<.001$ , respectively). In addition, *Artery* was selected as the most salient ad more often than *Brain, Lung, and Older Than Dead* ( $Z=2.88, p<.01$ ;  $Z=3.58, p<.001$ ;  $Z=3.97$  and  $p<.001$ , respectively).

Table 10. Percent of participants rating each recalled advertisement as most salient.

Ad	Ad Type	
	Fear-only	Fear with Disgust
<i>Echo</i>	18.4% (8.9-34.3)	
<i>Still Can't Quit</i>	47.4% (32.0-63.3)	
<i>Krystell Memorial</i>	28.9% (16.6-45.5)	
<i>Before and After</i>	5.3% (1.3-19.2)	
<i>Treatment</i>	0% (0.0-0.0)	
<i>Artery</i>		42.9% (27.5-59.8)
<i>Lung</i>		2.9% (.4-18.3)
<i>Older than Dead</i>		0% (0.0-0.0)
<i>Brain</i>		8.6% (2.7-23.9)
<i>Voicebox</i>		45.7% (29.9-62.4)

Thinking about ads. The extent to which participants reported thinking about specific ads during the two-week period preceding the follow-up interview was also examined using the Complex Samples Procedure in SPSS 14.0 (see table 11). On average, there were no significant differences in the likelihood that participants thought about a Fear-only (52%) versus a Fear with Disgust ad (59%) during the two-week,

follow-up period. Comparisons between ads within each Ad Type condition using z-tests for proportions also revealed no significant differences.

Table 11. Percentage of participants having thought about an advertisement from those recalling the advertisement at two-week follow-up.

Ad	Ad Type	
	Fear-only	Fear with Disgust
<i>Echo</i>	72.7% (40.7-91.2)	
<i>Still Can't Quit</i>	58.6% (40.0-75.1)	
<i>Krystell Memorial</i>	52.2% (32.1-71.6)	
<i>Before and After</i>	31.8% (15.7-53.9)	
<i>Treatment</i>	56.3% (31.9-77.9)	
<i>Artery</i>		66.7% (45.7-82.6)
<i>Lung</i>		52.9% (29.8-74.9)
<i>Older than Dead</i>		66.7% (26.1-91.9)
<i>Brain</i>		35.7% (15.4-62.9)
<i>Voicebox</i>		65.4% (45.3-81.2)

Discussing the ads. The extent to which participants reported discussing the specific ads with others during the two-week period preceding the follow-up interview was also examined using the Complex Samples Procedure in SPSS 14.0 (see table 12). On average, there were no significant differences in the likelihood that participants discussed with a friend a Fear-only ad (38%) versus a Fear with Disgust ad (36%). Comparisons between ads within each Ad Type condition using z-tests for proportions found significant differences only within the Fear with Disgust condition and then only between *Older Than Dead* and three of the other four ads that were discussed more often: *Artery* ( $Z=3.03, p<.01$ ), *Voicebox* ( $Z=3.48, p<.01$ ), and *Brain* ( $Z=2.37, p<.05$ ).



Table 12. Percentage of participants reporting discussing an advertisement with friends from those recalling the advertisement at two-week follow-up.

Ad	Ad Type	
	Fear-only	Fear with Disgust
<i>Echo</i>	45.5% (19.9-73.7)	
<i>Still Can't Quit</i>	51.7% (33.7-69.3)	
<i>Krystell Memorial</i>	43.5% (24.9-64.1)	
<i>Before and After</i>	27.3% (12.6-49.4)	
<i>Treatment</i>	18.8% (6.0-45.4)	
<i>Artery</i>		50.0% (30.6-69.4)
<i>Lung</i>		17.6% (5.7-43.4)
<i>Older than Dead</i>		0% (0-0)
<i>Brain</i>		35.7% (15.4-62.9)
<i>Voicebox</i>		57.7% (38.1-75.1)

#### *Analyses of Smokers' Readiness to Quit Across Time*

A mixed-design 2 (Ad Type) by 3 (Time) ANCOVA with cigarettes smoked per week as the covariate was conducted on participant responses to the *Contemplation Ladder* question before viewing the advertisements, after viewing the advertisements, and during the follow-up interview. The analysis did not show significant interactions with the proposed covariate. Thus, mean readiness to quit was adjusted for the effect of the covariate (i.e., number of cigarettes smoked per week). Results indicated that only the main effect of Time approached significance [ $F(2, 70) = 2.87, p=.06$ ]. As shown in Figure 4, study participants tended to report a greater readiness to quit after viewing the advertisements in the laboratory though their readiness to quit decreased to near-baseline levels at the two-week, follow-up interview.

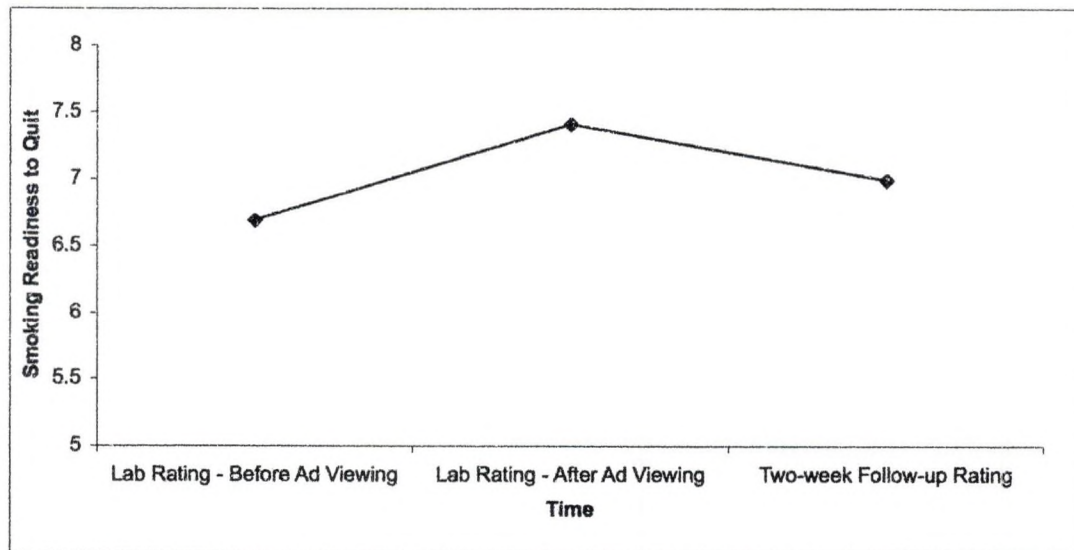


Figure 4. Smoker Readiness to Quit Across Time for the Entire Sample. Each mean rating of participant readiness to quit is indicated by a bold square.

#### *Analyses of Smoking Behavior at Follow-up*

To examine differences in participants' quit attempts at follow-up, a chi-square analysis examining the effect of Ad Type (Fear-only ad condition versus Fear with Disgust ad condition) on Quit Attempts (yes versus no) was conducted. This analysis did not find any significant differences. ( $p > .1$ ). Table 13 provides a breakdown for participants reporting quit attempts within each Ad Type condition.

Table 13. Participants in each Ad Type condition reporting a quit attempt at follow-up.

Ad Type	Quit Attempt	
	Yes	No
Fear-only	17	19
Fear with Disgust	15	21

A one-way ANCOVA was conducted examining the effect of Ad Type (Fear-only ads versus Fear with Disgust) on the number of cigarettes smoked on average per day over the past two weeks prior to the follow-up interview. The average number of

cigarettes smoked per day before the study was used as a covariate in this analysis. The main effect of Ad Type was not statistically significant ( $p>.05$ ).



## CHAPTER FOUR

### DISCUSSION

The purpose of this study was to test the hypothesis that anti-smoking ads are effective by means of eliciting negative emotional states, particularly disgust (Goetz et al., 2007; Vogeltanz-Holm et al., 2009; Wakefield et al., 2003, 2006). In this study, we compared two sets of ads (i.e., Ad Type): those high in fear and disgust and those high in only fear. We hypothesized that subjective and physiological responses to ads would depend upon whether the ad elicited both fear and disgust or just fear. We also predicted that participants exposed to the ads pairing disgust with fear would have higher rates of recall and engagement (i.e., having thought about or discussed the ads that were recalled) than those exposed to ads eliciting only fear. Last, we predicted that participants viewing the ads pairing disgust with fear would report a greater readiness to quit, more quit attempts, and fewer smoked cigarettes at follow-up.

Results were mixed regarding the hypothesis that the ads pairing fear and disgust would show greater subjective and physiological reactivity. Although participants in the fear with disgust condition did have higher self-report ratings of disgust, they did not show greater physiological reactivity for those ads. Also contrary to the hypotheses, there were no differences between the ad types on measures of ad recall, saliency, or engagement (i.e., thought about or discussed) at follow-up. Nonetheless, the best recalled ads seemed to share some similar features including eliciting both disgust and fear. There were no differences between the ad types on follow-up readiness to quit, cigarette

smoking, or quit attempts. There were some unexpected findings indicating that participants' levels of smoking influenced their perceptions of the different ads. A discussion of these findings in the context of the current literature is presented below.

### *Self-report Responses*

Analyses of fear and disgust ratings showed some differences between the two ad conditions as well as across individual ads. First, there were no differences in fear ratings between ads in the two conditions, though participants did rate the ads pairing disgust with fear as more disgusting than the fear-only ads. This suggests that the ads were well-matched on fear and that there was an adequate difference between conditions in the mean level of disgust elicited by the ads.

In addition to differences in disgust ratings between ad type conditions, there were several differences between individual ads within each condition. Among the fear-only ads, participants rated the *Krystell-Memorial* ad as eliciting greater disgust than the *Before and After* and *Treatment* ads. *Krystell-Memorial* depicts a dying woman with obesity wearing an oxygen mask and appearing to gasp for air. Data suggested that this ad elicited more disgust among participants than the researchers had expected based on the pilot data. Among the ads pairing disgust with fear, participants had higher disgust ratings for the ad *Artery* than the *Older than Dead* and *Lung* ad. *Artery* depicts a physician removing fatty deposits from the aorta of a smoker and is quite graphic. This ad has been well established as an ad that is rated highly on measures of fear, disgust, as well as an effective antismoking ad (e.g., Donovan et al., 2003; Goetz et al. 2007; Vogeltanz-Holm, et al. 2009). The level of reported disgust response for *Artery* was significantly higher than the other advertisements and while it is commonly reported in



the literature as being effective, there may be other ad characteristics or sensation values (e.g., being complex, intense, graphic and explicit, ambiguous, unconventional, fast-paced, or suspenseful stimuli) that make this, and other similar ads, emotionally charged and effective (e.g., Donohew, Lorch, & Palmgreen, 1998) for reasons other than disgust.

*Effects of Cigarette Smoking.* The finding that ads pairing disgust with fear had different effects on participants' subjective responses depending on their smoking level (e.g., moderate versus low) is an important contribution because no known previous laboratory study has examined the role of smoking level in the evaluation and effectiveness of antismoking advertisements. Moderate smokers tended to provide no differences in disgust ratings regardless of which group of ads they viewed whereas low smokers reported greater disgust for fear with disgust ads compared to the fear-only ads. Similarly, moderate smokers reported greater levels of fear if they viewed the fear-only ads than if they viewed the fear with disgust ads. They also reported higher levels of fear for the fear-only ads than did the low smokers. In general, it seems that pairing disgust with fear tends to result in less of a response from moderate smokers than it does from those who smoke less. There have been some other interesting studies examining subgroups of smokers and reactions to antismoking ads. Two studies have reported that the strength of negative emotions elicited by an ad is unrelated to its effectiveness for smokers in general, but those smokers who are more ready to quit do perceive ads eliciting negative emotions as effective (Biener, McCallum-Keeler, & Nyman, 2000; Farrelly et al., 2002). In sum, it may be that more addicted smokers perceive greater difficulty quitting and accept health consequences of smoking and are therefore no more fearful or disgusted by antismoking ads depicting negative health outcomes.



Alternatively, less established smokers might be more sensitive to the potential for health consequences communicated through messages eliciting fear and disgust.

### *Physiological Responses*

One unique aspect of the present study relative to most other antismoking advertisement studies was the addition of physiological measures. Although a deceleration in heart rate from baseline to after viewing the slide for the first time was found for all ads, the hypothesis that ads pairing disgust with fear would show a stronger association than the fear-only ads was not supported. This overall heart rate deceleration likely represents an orienting response to the advertisement stimuli. Some researchers suggest that heart rate deceleration occurs as a function of facilitating the reception of stimuli or increased attention (Lacey et al., 1963; Lang, Dhillon, & Dong, 1995) associated with an orienting response (Graham & Clifton, 1966) mediated by the parasympathetic nervous system. Similarly, SCRs in the current study increased from baseline to after viewing the ad for the first time, but SCRs also increased from baseline to after viewing the ad for the second time. This increase in SCRs also likely represents an overall orienting response to the advertisement stimuli that occur with distinct stimuli (e.g., Lang, Greenwald, Bradley, & Hamm, 1993). Participants viewing the fear with disgust ads had overall lower mean SCL than participants viewing the fear-only ads, though there was no interaction with time. This suggests that presenting the stimuli did not result in a change in SCL, rather it was lower across all time periods. The SCL and SCR data are difficult to describe. Although Hall (2004) found that skin conductance and heart rate responses identified emotionally arousing advertisements, others (LaBarbera & Tucciarone, 1995) found that skin conductance was often uncorrelated with self-report

measures or ratings of advertisements. Participants viewing the fear-only ads had overall higher diastolic blood pressure than did participants viewing the fear with disgust ads though much like with SCL, there were no interactions with Time. There were also no effects for systolic blood pressure. Disgust responses, unlike fear responses, are largely mediated by the parasympathetic branch of the autonomic nervous system (Levenson, 1992), which is likely to result in such physiological reactions including reduced heart rate and blood pressure (Levenson, Ekman, & Friesen, 1990; Sledge, 1978). In all, the psychophysiological findings are inconsistent with the hypothesis that physiological reactivity would be more associated with ads eliciting higher levels of disgust.

*Effects of Cigarette Smoking.* A significant effect of the covariate for SCL and diastolic blood pressure ratings indicated that increased smoking level was associated with increased physiological reactions for participants viewing the ads with fear and disgust characteristics. Interestingly, there was also a positive trend for participants who smoked more to have increased heart rate, SCRs, and diastolic blood pressure. The finding that increased smoking level was associated with increased heart rate provides evidence that smoking is associated with lower vagal tone and autonomic flexibility (e.g., Masi et al., 2007; Nabors-Oberg, 2002; Thayer & Lane, 2007), which provides evidence for a higher risk for disease even at a low level of cigarette smoking (e.g., Masi et al., 2007). On a positive note, many researchers have provided evidence for cardiovascular and sympathetic nervous system measures to return to normal levels with smoking cessation (Minami, Ishimitsu, & Matsuoka, 1999; Stein, Rottman, & Leiger, 1996; Yotsukura, Yoide, & Fulii, 1998).

#### *Follow-up Results*



Overall, the follow-up results provide no significant evidence that fear-only or fear with disgust ads were any more or less effective at a two-week follow-up. Although in general, it seems clear that within each ad condition, the more disgusting an ad was rated, the more salient and somewhat more recalled the ad was. For example, *Artery* and *Voicebox* had the highest disgust ratings and were also recalled the most and rated as most salient. Among the fear with disgust ads and *Krystell-Memorial* had the highest disgust ratings among the fear-only ads and was rated as one of the more salient ads.

Also contrary to the hypotheses, there were no differences between the fear-only and fear with disgust ad conditions in terms of whether or not participants were ready to quit smoking. Likewise, there were no differences between the conditions on quit attempts. Readiness to quit for the total sample revealed a significant increase in readiness to quit from the initial baseline to after viewing the advertisements. This effect was lost at follow-up. Previous laboratory studies have found the readiness to quit level to be maintained at one week (e.g., Goetz, et al., 2007; Pechmann & Reibling, 2006) though the current study provides some evidence that the effect is lost with time. Previous field studies (e.g., Borland & Balmfor, 2003) have found regular exposure to antismoking advertisements as resulting in maintaining readiness to quit smoking. Donovan, Boulter, Borland, Jalleh, and Carter (2003) also found that throughout the NTC campaign, smokers moved toward greater readiness to quit and quitting behavior. In summary, it seems that a single exposure to a set of ads is not sufficient in maintaining the effectiveness of the ads.

### *Limitations*



There were several limitations with this study. First, it could be argued that the sample was not representative of the strongly addicted young adult smoking population. However, the findings should generalize to typical young adult smokers. Young adult smokers have been found to be more likely than other adult smokers to smoke only occasionally, and to consume fewer than 10 cigarettes per day (Biener & Albers, 2004). This data is also consistent with our sample. Moreover, this seems to be an especially important population as they have been shown to be more receptive to cigarette marketing and patron bars and clubs more frequently where smoking is more common, which leads in increased smoking behavior (Biener & Albers, 2004).

To our knowledge, this is the first study using a between-subjects design of ad types examining fear-only and fear with disgust responses to antismoking advertisements within a young adult sample. This is a contribution in and of itself to the literature. However, generalizing these results to a young adult population must be done cautiously. The sample was almost exclusively White and thus is limited in applicability to other ethnic groups. Finally, the necessity of using the between-subjects design means that it was impossible to directly compare the recall, saliency, and engagement for the two types of ads and therefore difficult to draw conclusions.

Next, the expected analyses were appropriately powered though there were some additional unplanned analyses in the linear mixed models in which the covariate was added as a fixed effect when it interacted with the other fixed effects. Nonetheless, there were no effects or interactions that were close to significance. It is unlikely that additional participants would have resulted in significance.

### *Conclusions*

The present study sought to differentiate ads eliciting a fear and disgust response from those eliciting fear in the absence of disgust. The goal was to increase our understanding of how negative emotion is associated with the effectiveness of anti-smoking media messages (e.g., Goetz et al., 2007; Vogeltanz-Holm et al., 2009; Wakefield et al., 2003, 2006). Results confirmed the hypothesis that participants viewing the fear with disgust ads compared to participants viewing the fear-only ads had higher subjective ratings of disgust and similar ratings of fear. An unexpected finding revealed that moderate smokers, compared to low smokers, tended to be less reactive to the disgust aspect of the ads. Physiological data showed orientation to the stimuli (e.g., heart rate, SCRs) as a whole, though the hypotheses were not supported. Also contrary to the hypotheses, there were no differences between the ad types on measures of ad recall, saliency, or engagement (i.e., thought about or discussed) at follow-up as previous research and theory suggested there would be (e.g., Goetz et al., 2007; Vogeltanz-Holm et al., 2007). Last, there were no differences between the ad type conditions in having reported smoking fewer cigarettes or reporting a greater intention to quit smoking at baseline or follow-up.

#### *Implications and Future Directions*

The findings of this study have implications for the appropriate development and use of television or web-based antismoking advertisements for young adults. In particular, this study suggests that depending on smoking level, young adults may experience differing emotional reactions to antismoking advertisements. Though not the first study to examine ads that elicit a fear response (e.g., Terry-McElrath et al., 2005; Wakefield et al., 2003), this is the first study to examine between-group differences of

fear and disgust in the effectiveness of antismoking advertisements among young adults. Further such research would assist in identifying specific characteristics that make an antismoking advertisement most effective.

The current study brings forth a number of issues that warrant exploration. First, participants were exposed to the advertisements in a single session. Future research designs should implement a naturalistic method of presenting the ads as they might appear in a media campaign (e.g., ads viewed spread out over the course of weeks or months). One way of accomplishing this may be to have participants view and evaluate particular ads online. Further data may be provided with the inclusion of ambulatory physiological recording devices. Next, it will be useful to continue to examine individual differences (e.g., smoking level, readiness to quit, etc.) to better understand negative emotion theory and effectiveness of antismoking ads within different groups. Last, other future research may involve brain image measurement as alternate means of assessing emotional and other types of cognitive engagement (as also suggested by Hall, 2004).



## APPENDICES



## Appendix A

### Informed Consent

This research project is being conducted by Mark Goetz, a graduate student in psychology at the University of North Dakota (UND) under the supervision of Dr. Nancy Vogeltanz-Holm and Dr. Jeff Holm of the UND Center for Health Promotion and Prevention Research and the UND Psychology Department. Consent to participate in this research is based on the understanding of the nature and possible risks of the research. Based on the following information, you may decide if you wish to participate in this study.

The study will take approximately 90 minutes. Although volunteering, you will receive extra credit or financial compensation as reimbursement for participating in this study. Should you discontinue the study, you will not be penalized in your class standing with your professor, grade, nor extra credit points for each component of this study. If you wish to discontinue the study, inform the researcher at any point you wish to do so.

The purpose of this study is to examine young adults' responses to anti-smoking campaigns. If you agree to participate in this study, you will be asked to complete initial questionnaires about your smoking status, demographics, and previous exposure to anti-smoking advertisements. You will then have sensors attached to your hand to measure your pulse rate and the natural electrical activity of your skin and a cuff around your arm to measure blood pressure while you view anti-smoking video clips. After watching each video clip twice you will complete a questionnaire about your attitudes and reactions to the clip. Finally, two-week after completing this session in the laboratory you will be contacted by phone for a 20-minute interview about the video clips you view today.

All information obtained in this study will be confidential. Your name will be connected with your responses only until you complete the phone interview and receive your compensation. At that point, the link between your name and your responses will be removed. All information from you will be stored in a locked laboratory for a required time of three years. At that time, all questionnaires and consent forms will be destroyed. Only the researcher, advisers, research assistants, and people who audit IRB procedures will have access to the data. Additionally, you will receive a copy of this consent form.

There are some minor risks involved with participation in this study. Some of these risks may involve feeling uncomfortable or some emotional discomfort from viewing the advertisements. In the event that you have any such experiences, please let the researcher know or feel free to contact the principal investigator (Mark Goetz - 777-6496) or this project's faculty advisors, Dr. Jeffrey Holm (777-4046) or Dr. Nancy Vogeltanz-Holm (777-4046). Finally, you can also contact directly the Psychological Services Center in 210 Montgomery Hall or at 777-691 or the University Counseling Center, 2<sup>nd</sup> Floor McCannel Hall, 777-4189. These facilities provide free services to university students.

Findings from this study are expected to further scientific knowledge about the effectiveness of anti-smoking campaigns. Participation in this study will contribute to that knowledge. No individual participants' information will be disseminated; rather the information will be presented as a whole in combination with all participants such that no single participant can be identified.

If you have any questions or concerns about the research, please call Mark Goetz at (701) 777-6496. You may also contact Dr. Nancy Vogeltanz-Holm at (701) 777-3148 or Dr. Jeff Holm at (701) 777-4046, or the UND Office of Research and Program Development at (701) 777-4279.

By signing below, I am indicating that I have read and understood this consent form and voluntarily choose to participate in the study.

\_\_\_\_\_  
Participant Name (*Printed*)

\_\_\_\_\_  
Participant Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of Person Who Obtained Consent

\_\_\_\_\_  
Date



## Appendix B

### Advertisement Descriptions (CDC, 2008)

#### *Fear Without Disgust:*

##### Echo (Ad #1)

- Campaign: None
- Theme: Cessation
- Target Audience: General
- Date produced: 2002
- Description: A montage of people discuss why they can't quit smoking. Each person gives an excuse as to why he/she won't quit or are not willing to try to quit. Between each of these individuals, a person either very sick or dying from tobacco use provides an ironic analogy to the other person's excuse.
- Pilot data:
  - Mean fear rating: 2.2
  - Mean disgust rating: 1.5

##### Still Can't Quit (Ad #2)

- Campaign: Just Eliminate Lies (Iowa)
- Theme: Addiction, Youth - Prevention, Youth - Cessation, Health Consequences of Smoking
- Target Audience: Youth and Young Adults
- Date produced: 2002
- Description: A teen sits anxiously in a hospital examination room. The teen introduces himself as Jeff Sprague, a 15-year-old who started smoking at age 11. He says that he is addicted to cigarettes; in fact, he was addicted three weeks after he started. He now has spots on his lungs that could turn into cancer. This scares him and yet he still can't quit.
- Pilot data:
  - Mean fear rating: 2.7
  - Mean disgust rating: N/A (ad was originally not included in pilot data given a CDC website error and fear ratings were borrowed from Goetz et al., 2007)

##### Krystell-Memorial (Ad #3)

- Campaign: I Can't Breathe
- Theme: Health Consequences
- Target Audience: Adults, youths, and young adults
- Date produced: 2002
- Description: Pam Laffin's daughter, Krystell, talks about how she doesn't want to grow up to be like her mom. It scares her to imagine what her life would be like if she were dying from emphysema.
- Pilot data:
  - Mean fear rating: 2.36

- Mean disgust rating: 1.21

#### Before and After (Ad #4)

- *Campaign:* Before and After
- *Theme:* Cessation - General, Health Consequence of Smoking
- *Target Audience:* Adults
- *Date produced:* 2002
- *Description:* Mike Sams describes all the things he may miss in life now that he is dying of lung cancer.
- Pilot data:
  - Mean fear rating: 1.85
  - Mean disgust rating: 1.08

#### Treatment (Ad #5)

- *Campaign:* Mike Sams
- *Theme:* Cessation – General, Health Consequence of Smoking
- *Target Audience:* Adults
- *Date produced:* 2004
- *Description:* Mike Sams shares his fears of dying from lung cancer. He talks about how he couldn't believe his chemotherapy and radiation therapy were really happening to him.
- Pilot data:
  - Mean fear rating: 2.0
  - Mean disgust rating: 1.08

#### *Fear with Disgust:*

##### Artery (Ad #6)

- *Campaign:* Every Cigarette Does Damage (NTC)
- *Theme:* Health Consequences of Smoking
- *Target Audience:* Adults
- *Date produced:* 2000
- *Description:* A doctor removes fatty deposits from the aorta of a 32-year-old smoker.
- Pilot data:
  - Mean fear rating: 2.4
  - Mean disgust rating: 4.27

##### Lung (Ad #7)

- *Campaign:* Every Cigarette Does Damage
- *Theme:* Health Consequences of Smoking
- *Target Audience:* Adults
- *Date produced:* 1999



- Description: A woman stands and smokes outside her office building. The camera follows the smoke that she inhales into her lungs, illustrating the damage that each puff of smoke does to the human lung.
- Pilot data:
  - Mean fear rating: 1.93
  - Mean disgust rating: 3.0

#### Older Than Dead (Ad #8)

- Campaign: Tobacco Smokes You
- Theme: Youth-Prevention, Health Consequences of Smoking
- Target Audience: Youths and Young Adults
- Date produced: 2002
- Description: A young man begins smoking at a party. The camera follows the cigarette smoke into his body and shows the effects of smoking on his internal organs.
- Pilot data:
  - Mean fear rating: 2.2
  - Mean disgust rating: 2.43

#### Brain (Ad #9)

- Campaign: Every Cigarette Does Damage
- Theme: Health Consequences of Smoking
- Target Audience: Adults
- Date produced: 2000
- Description: A brain is cut in half to show the clot that has formed due to cigarette smoke.
- Pilot data:
  - Mean fear rating: 2.2
  - Mean disgust rating: 3.67

#### Voicebox (Industry) (Ad #10)

- Campaign: Voicebox Campaign
- Theme: Cessation – General, Youth – Prevention, Tobacco Industry Manipulation
- Target Audience: Youths and Young Adults
- Date produced: 2000
- Description: A middle-aged woman, Debi Austin, with a very raspy voice briefly explains her inability to quit smoking and then ends the spot by inhaling her cigarette through a stoma (hole) in her throat.
- Pilot data:
  - Mean fear rating: 2.07
  - Mean disgust rating: 2.60

## Appendix C

### Smoking Status, Attitudes and Demographic Questionnaire

1. How old are you? \_\_\_\_\_ (AT LAST BIRTHDAY)
2. Which of the following categories best describes your race or ethnic group?
  - ☐ White
  - ☐ Black
  - ☐ Hispanic
  - ☐ Asian
  - ☐ Other
3. What is your gender?
  - ☐ Female
  - ☐ Male
4. What is the highest grade-level of education that you have completed?

### *Smoking History*

1. How old were you when you first smoked a cigarette?
2. How old were you when you started smoking daily?
3. Have you smoked within the last 30 days, even a puff?
  - ☐ Yes
  - ☐ No
4. Have you smoked 100 cigarettes or more in your lifetime?
  - ☐ Yes
  - ☐ No

### *Current Smoking Exposure*

1. How many cigarettes do you smoke per day?
2. Do you currently live with another smoker?



### *Tobacco Dependence*

1. How soon after you wake up do you smoke your first cigarette?
  - a. Within 5 minutes
  - b. 6-30 minutes
  - c. 31-60 minutes
  - d. After 60 minutes
2. Do you find it difficult to refrain from smoking in places where it is forbidden (e.g., in church, at the library, in cinema, etc.)?
  - a. Yes
  - b. No
3. Which cigarette would you hate most to give up?
  - a. The first in the morning
  - b. All others
4. Do you smoke more frequently during the first hours after waking than during the rest of the day?
  - a. Yes
  - b. No
5. Do you smoke if you are so ill that you are in bed most of the day?
  - a. Yes
  - b. No

### *Quitting History*

1. How many times have you tried to quit?
2. When was your last quit attempt?
3. Have you ever used nicotine gum or patches on any quit attempt?  
☐ Yes  
☐ No

4. Have you ever participated in a quit smoking program?

☐ Yes

☐ No

5. Over the past year, did you ever quit for 24 hours or more?

☐ Yes

☐ No

Please answer your level of agreement with the following statements:

1. Cigarette smoking is dangerous to my health.

1  
Disagree

2

3  
Somewhat  
Agree

4

5  
Agree

2. Someday I will suffer from an illness such as cancer or lung disease because of smoking.

1  
Disagree

2

3  
Somewhat  
Agree

4

5  
Agree

### *Quitting Motivation/Plans*

1. Are you seriously planning to quit within the next 30 days?

☐ Yes

☐ No

2. Are you seriously planning to quit within the next 6 months?

☐ Yes

☐ No

3. How motivated are you to quit smoking in the next 6 months?

1  
Not at all

2

3  
Somewhat

4

5  
Very



Motivated

Motivated

Motivated

4. Please rate how ready you are to quit smoking:

0	1	2	3	4	5	6	7	8	9	10
No thought of quitting		I think I need to consider quitting someday			I think I should quit but not quite ready			Starting to think about how to change my smoking patterns		Taking action to quit (e.g., cutting down, enrolling in a program)

5. How confident are you that you could successfully quit smoking in the next 6 months?

1	2	3	4	5
Not at all confident		Somewhat confident		Very confident

If you answered a "9" or above on Question #4 ("Please rate how ready you are to quit smoking") please complete the "Reasons for Quitting Scale"

*Reasons for Quitting Scale* (Curry et al., 1990)

I WANT TO QUIT SMOKING:

- 0= Not at all true
- 1=A little true
- 2=Moderately true
- 3=Quite true
- 4=Extremely true

1. Because I am concerned that I will suffer from a serious illness if I don't quit smoking.....0.....1.....2.....3.....4

2. To show myself that I can quit smoking if I really want to.....0.....1.....2.....3.....4

3. So that my hair and clothes won't  
smell.....0.....1.....2.....3.....4
4. Because my spouse, children, or  
other person I am close to will  
stop nagging me if I quit smoking.....0.....1.....2.....3.....4
5. Because I have noticed physical  
symptoms that smoking is  
hurting my health.....0.....1.....2.....3.....4
6. Because I will like myself better if I  
quit smoking.....0.....1.....2.....3.....4
7. So that I will save money on  
smoking related costs such as  
dry cleaning.....0.....1.....2.....3.....4
8. Because someone has given me  
an ultimatum (made a threat) to  
quit.....0.....1.....2.....3.....4
9. Because I can graphically picture  
the effects that smoking has on  
my body.....0.....1.....2.....3.....4
10. So that I can feel in control of  
my life.....0.....1.....2.....3.....4
11. Because I won't burn holes in  
clothing or furniture.....0.....1.....2.....3.....4
12. Because I will receive a special  
gift if I quit.....0.....1.....2.....3.....4
13. Because I have known other  
people who have died from serious  
illnesses that were caused by  
smoking.....0.....1.....2.....3.....4
14. Because quitting smoking will  
prove that I can accomplish other  
things that are important to me.....0.....1.....2.....3.....4
15. Because I want to save money



that I spend on cigarettes.....0.....1.....2.....3.....4

16. Because people I am close to will  
be upset with me if I don't quit.....0.....1.....2.....3.....4

17. Because I am concerned that  
smoking will shorten my life.....0.....1.....2.....3.....4

18. To prove to myself that I am not  
addicted to cigarettes.....0.....1.....2.....3.....4

19. So that I won't have to clean my  
house or car as often.....0.....1.....2.....3.....4

20. Because I will receive a  
financial reward for quitting  
(money from a friend or family  
member, bonus from work, etc.).....0.....1.....2.....3.....4

## Appendix D

### Smoking Advertisement Background Questionnaire

1. In recent months, how often have you seen anti-smoking commercials on TV, or heard them on the radio? (Circle one)

- a. Not at all
- b. Less than once per month
- c. 1-3 times per month
- d. 1-3 times per week
- e. Daily or almost daily
- f. More than once a day

2. In recent months, about how often have you seen anti-smoking ads on billboards or in magazines and newspapers? (Circle one)

- a. Not at all
- b. Less than once per month
- c. 1-3 times per month
- d. 1-3 times per week
- e. Daily or almost daily
- f. More than once a day

3. To what extent do you think such ads on TV, radio, billboards or in magazines and newspapers have... (Circle one number for each statement)

	Not at all	To a little extent	To some extent	To a great extent	To a very great extent
...made you less favorable toward smoking cigarettes?	1	2	3	4	5
...made you less likely to smoke cigarettes?	1	2	3	4	5
...overstated the dangers or risks of cigarette smoking?	1	2	3	4	5



## Appendix E

### Advertisement-Rating Form

1. What is the MAIN point that this ad is trying to make?

2. What ELSE is it trying to say?

3. How well do the following phrases describe this ad? (Circle one number for each phrase)

This ad...	Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
...was clear	1	2	3	4	5
...had a message that was important to me	1	2	3	4	5
...said things that were hard to believe	1	2	3	4	5
...made me stop and think	1	2	3	4	5
...made me curious to know if what the ads says is true	1	2	3	4	5
...is one that I would talk to other people about	1	2	3	4	5
...told me something new	1	2	3	4	5

... talked down to me	1	2	3	4	5
-----------------------	---	---	---	---	---

This ad made me feel...	Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
...sad	1	2	3	4	5
...angry	1	2	3	4	5
...happy	1	2	3	4	5
...scared	1	2	3	4	5
...disgusted	1	2	3	4	5

4. Please rate the ad on the following two scales:

a. Overall, how unpleasant was this ad?

1	2	3	4	5
Pleasant		Neutral		Very Unpleasant

b. Overall, how emotionally arousing was this ad?

1	2	3	4	5
Not at all emotionally arousing		Somewhat emotionally arousing		Very emotionally arousing

5. Overall, I thought this ad was a very good anti-smoking advertisement:

1	2	3	4	5
Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree



6. What makes it that way?

7. Have you seen this ad on TV before today?

- ☐ Yes
- ☐ No
- ☐ Not Sure

8. Which one of these ads most made you stop and think? (Circle one answer only)

Echo (Ad #1) - A montage of people discuss why they can't quit smoking. Each person gives an excuse as to why he/she won't quit or are not willing to try to quit. Between each of these individuals, a person either very sick or dying from tobacco use provides an ironic analogy to the other person's excuse.

Still Can't Quit (Ad #2) - A teen sits anxiously in a hospital examination room. The teen introduces himself as Jeff Sprague, a 15-year-old who started smoking at age 11. He says that he is addicted to cigarettes; in fact, he was addicted three weeks after he started. He now has spots on his lungs that could turn into cancer. This scares him and yet he still can't quit.

Krystell-Memorial (Ad #3) - Pam Laffin's daughter, Krystell, talks about how she doesn't want to grow up to be like her mom. It scares her to imagine what her life would be like if she were dying from emphysema.

Before and After (Ad #4) - Mike Sams describes all the things he may miss in life now that he is dying of lung cancer.

Treatment (Ad #5) - Mike Sams shares his fears of dying from lung cancer. He talks about how he couldn't believe his chemotherapy and radiation therapy were really happening to him.

- OR -

Artery (Ad #6) - A doctor removes fatty deposits from the aorta of a 32-year-old smoker.

Lung (Ad #7) - A woman stands and smokes outside her office building. The camera follows the smoke that she inhales into her lungs, illustrating the damage that each puff of smoke does to the human lung.

Older Than Dead (Ad #8) - A young man begins smoking at a party. The camera follows the cigarette smoke into his body and shows the effects of smoking on his internal organs.

Brain (Ad #9) - A brain is cut in half to show the clot that has formed due to cigarette smoke.

Voicebox (Industry) (Ad #10) - A middle-aged woman, Debi Austin, with a very raspy voice briefly explains her inability to quit smoking and then ends the spot by inhaling her cigarette through a stoma (hole) in her throat.

## Appendix F

### Follow-up Questionnaire

INTERVIEWER: Hello. I am \_\_\_\_ calling from the University of North Dakota, can I speak to \_\_\_\_ please?

When participant is on the line: Hello. I have a few questions to ask you in relation to the ads you saw two weeks ago.

1. Do you remember any of the ads that you saw in [the Corwin-Larimore building at the University of North Dakota] on [DATE]?

Yes (GO TO NEXT QUESTION)

No (THANK AND END INTERVIEW)

2. Please describe the anti-smoking ads that you remember. [Interviewer: AFTER EACH DESCRIPTION, ASK: Any other ads that you remember? REPEAT UNTIL NO MORE ADS ARE RECALLED. REFER TO THE LIST BELOW TO IDENTIFY ADS. WRITE ORDER OF RECALL (1=FIRST AD RECALLED, 2=SECOND AD RECALLED ETC...) IN BOX NEXT TO AD DESCRIPTION. IF RESPONDENT'S DESCRIPTION DOES NOT MATCH AD DESCRIPTION, PROMPT FOR MORE DESCRIPTION. IF STILL UNABLE TO MATCH TO LIST, WRITE VERBATIM DESCRIPTION BELOW.

AD ID	Ad Title	Order of Ad Recall
1	Echo	
2	Still Can't Quit	
3	Krystell-Memorial	
4	Before and After	
5	Treatment	

OR

AD ID	Ad Title	Order of Ad Recall
1	Artery	
2	Lung	
3	Older Than Dead	
4	Brain	
5	Voicebox (Industry)	

UNCLASSIFIED VERBATIM DESCRIPTIONS

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3. Which one ad stands out most in your mind?

[INTERVIEWER: WRITE THE ID NUMBER OF THE AD FROM LIST]

(IF NO AD STANDS OUT, SKIP TO Q. 24)

4. Over the past week, did you happen to think about anything specific in this ad since the rating session?

YES

NO

5. Over the past week, did you happen to discuss this ad with anyone?

YES

NO

6. You described the ad where...

7. Over the past week, did you happen to think about anything specific in this ad since the rating session?

YES

NO

8. Over the past two weeks, did you happen to discuss this ad with anyone?

YES

NO

9. You described the ad where...

10. Over the past two weeks, did you happen to think about anything specific in this ad since the rating session?

YES

NO

11. Over the past two weeks, did you happen to discuss this ad with anyone?

YES

NO

12. You described the ad where...

(IF NO OTHER AD DESCRIBED, SKIP TO Q. 24)

13. Over the past two weeks, did you happen to think about anything specific in this ad since the rating session?

YES

NO

14. Over the past two weeks, did you happen to discuss this ad with anyone?

YES

NO

15. You described the ad where...

16. Over the past two weeks, did you happen to think about anything specific in this ad since the rating session?

YES

NO

17. Over the past two weeks, did you happen to discuss this ad with anyone?

YES

NO

18. In the two weeks since the initial ad rating session at [LOCATION] on [DATE], have you seen any anti-smoking advertising on TV at all?

YES

NO (THANK AND END INTERVIEW)

NOT SURE (THANK AND END INTERVIEW)

REFUSED (THANK AND END INTERVIEW)

19. Did you see any of the same ones that you saw at the viewing session last two weeks?

YES

NO (THANK AND END INTERVIEW)

20. Which ones did you see?

[WRITE AD IDs THAT APPLY FROM LIST]

21. SMOKING BEHAVIOR:

1. How many cigarettes did you smoke per day over the past two weeks?
2. How soon after you wake up do you smoke your first cigarette?
  - c. Within 5 minutes
  - d. 6-30 minutes
  - e. 31-60 minutes
  - f. After 60 minutes
3. Over the past two weeks did you find it difficult to refrain from smoking in places where it is forbidden (e.g., in church, at the library, in cinema, etc.)?
  - a. Yes
  - b. No
4. Which cigarette would you hate most to give up?
  - a. The first in the morning
  - b. All others
5. Do you smoke more frequently during the first hours after waking than during the rest of the day
  - a. Yes
  - b. No
6. Do you smoke if you are so ill that you are in bed most of the day?
  - a. Yes
  - b. No

*Quitting History over the past two weeks*

7. Did you have a quit attempt over the past two weeks?  
☐ Yes  
☐ No
8. If yes to #7, have you ever used nicotine gum or patches on this quit attempt?  
☐ Yes  
☐ No
9. If yes to #7, did you seek out a quit smoking program?



☐ Yes

☐ No

10. If yes to #7, over the past year, did you ever quit for 24 hours or more?

☐ Yes

☐ No

Please answer your level of agreement with the following statements:

11. Cigarette smoking is dangerous to my health.

1  
Disagree

2

3  
Somewhat  
Agree

4

5  
Agree

12. Someday I will suffer from an illness such as cancer or lung disease because of smoking.

1  
Disagree

2

3  
Somewhat  
Agree

4

5  
Agree

### *Quitting Motivation/Plans*

13. Are you seriously planning to quit within the next 30 days?

☐ Yes

☐ No

14. Are you seriously planning to quit within the next 6 months?

☐ Yes

☐ No

15. How motivated are you to quit smoking in the next 6 months?

1  
Not at all  
Motivated

2

3  
Somewhat  
Motivated

4

5  
Very  
Motivated

16. Please rate how ready you are to quit smoking:

0	1	2	3	4	5	6	7	8	9	10
No thought of quitting		I think I need to consider quitting someday			I think I should quit but not quite ready			Starting to think about how to change my smoking patterns		Taking action to quit (e.g., cutting down, enrolling in a program)

17. How confident are you that you could successfully quit smoking in the next 6 months?

1	2	3	4	5
Not at all confident		Somewhat confident		Very confident

*Reasons for Quitting Scale* (Curry et al., 1990)

Administer this questionnaire if the answer to questions #7, #13, or #14 were "yes"

THANK AND END CALL.

# Do You Smoke Cigarettes Regularly? How about casually?

If you do, you can earn \$20 by participating in a psychology research project on smoking messages in the media

## Who

- Men and Women - 18 to 25 years old – who smoke cigarettes

## Earn

- Earn extra credit in psychology classes

**- OR -**

- \$20

## Contact

Mark Goetz

- Email: [mark.goetz@und.edu](mailto:mark.goetz@und.edu) (preferred)
- Phone: 777-3190

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