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Investigation of the impact of discrete emotions on tobacco-related outcomes

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in

Public Health

by

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This dissertation is dedicated to my daughter, Katherine Rome G. Lo Conte

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Smoking initiation among racial and ethnic minorities in college
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Dissertation executive summary

Smoking cigarettes accounts for 480,000 deaths in the U.S., and is the leading cause of morbidity and mortality (U.S. Department of Health and Human Services, 2014). While smoking cigarettes have declined, vulnerable populations continue to smoke at high rates (Jamal et al., 2018). In addition, new nicotine products have hit the market resulting in an exponential rise of initiation and use of products such as electronic nicotine delivery systems (Willett et al., 2018). Tackling smoking and use of tobacco products requires continued public health efforts including health communications and policy changes.

Graphic health warnings (GHWs) and anti-tobacco campaign ads are essential in disseminating information about the dangers of tobacco use to help prevent and stop tobacco use, as well as advocate for policy changes. One way GHWs and anti-tobacco ads try to accomplish this is by eliciting strong emotional arousal such as fear and disgust. Highly emotional anti-tobacco ads are perceived to be more effective than non-emotional anti-tobacco ads and are important predictors of positive outcomes (i.e. intention to quit, quitting) (S. J. Durkin, Biener, & Wakefield, 2009; Hafstad, Aarø, & Langmark, 1996; Wakefield, Flay, Nichter, & Giovino, 2003). However, research on fear-appeals show that they do not always work and are not always effective in changing behavior. Thus, whether tobacco-related cognitions (i.e. intentions) and behaviors can be influenced by emotions that are largely used in GHW and other health communication ads are not fully understood.

Moreover, there are opposing views of the role of emotions. One argument views emotions as coercive. For example, the tobacco industry has criticized the U.S. FDA on their use of emotions in their proposed graphic health warnings for cigarettes. The industry stated that emotions were used just to evoke negative emotions and to force people to quit, rather than convey information ("R.J. Reynolds Tobacco Co., et al., v. Food & Drug Administration, et al.," 2012). However, empirical evidence has demonstrated that emotions are important in processing information. According to health advocates, emotion is no longer thought of as a chaotic attribute, but rather is found to be salient in information processes and health outcomes. The Appraisal-Tendency Framework (ATF) describes the differential effect emotions have on decision-making. The ATF has been used to explain outcomes related to risks such as terrorism threats and driving, however studies on emotions and their effect on health behaviors, such as smoking, are scarce. Understanding the effect emotions have on tobacco-related outcomes is helpful in tobacco control efforts in developing effective anti-tobacco campaigns to decrease smoking and increase advocacy for smoking restriction policies. Based on the ATF and subsequent research, emotions are helpful in processing information, and that in turn, informs judgments and decision-making. Implications from this dissertation seek to add to the ATF and tobacco control literature by demonstrating effects and applicability of discrete emotions on tobacco-related judgments and decisions.

This dissertation explores the effects discrete emotions, specifically fear, anger, sadness, and disgust, have on tobacco-related outcomes. First, a systematic review of the literature was conducted to span the literature and consolidate findings that fear, anger, sadness, and disgust had on smoking-related outcomes. Out of the thirteen studies that met inclusion criteria, fear (n=12) was the most common researched emotion, followed by disgust (n=2) and anger (n=2), and then sadness (n=1). Outcomes varied from smoking-related intentions to quit to anti-smoking ad perceived effectiveness. Overall, there was a positive association with fear and smoking-related intentions to not smoke in nonsmokers, anger had an impact on attitudes towards indoor air policies, disgust is important in ad effectiveness, and sadness increases intentions to quit smoking.

Second, the Emotions and Health Study, an experimental study intended to elicit emotions, was conducted to test the causal effect of fear, anger, sadness, and disgust on smoking-related judgments. In multivariate analyses controlling for sociodemographics, anger and sadness increased perceptions of risk of smoking and perceptions of responsibility towards the tobacco companies. Perceptions of health risk are important in decreasing smoking initiation and perceptions of responsibility may be helpful in advocating for tobacco policy changes. Future studies are needed to fully understand how smoking-related perceptions of responsibility can affect tobacco-related behavior, such as advocacy for tobacco-related policy changes. Surprisingly intensity of fear and disgust, most common emotional-appeals used in graphic health warnings (GHW), were not associated with perceptions in this study. Therefore, this study demonstrated the utility of anger and sadness, especially their usefulness in GHW that may be used to keep GHW novel and effective.

Third, using data from the Emotions and Health Study, applicability of discrete emotions on smoking-related policy intentions related to smoking restrictions in permanent (i.e. multiunit housing) and temporary (hotel/Airbnb) living spaces, public areas, and in one's own personal driving vehicle were investigated. In multivariate analyses, attitudes on smoking restrictions and sociodemographics were associated with smoking ban advocacy intentions. However, emotions were not related to increasing advocacy and behavioral intentions around smoking ban policies. The only emotions examined were fear, anger, sadness, and disgust, and it is possible that other emotions such as worry or hope may be more applicable. More research is needed to understand the applicability of emotion on smoking-related policy intentions.

Overall emotions are helpful in processing information and have been found to have differential effects in smoking-related outcomes. Fear, anger, sadness, and disgust are common emotions elicited from anti-smoking campaigns and have the ability to increase intentions to not smoke, increase ad campaign effectiveness, and increase perceptions of risk and responsibility. Continued research is needed in this field of emotions and decision-making, especially around health behaviors such as smoking.

Chapter 1
Introduction

Graphic health warnings (GHWs) and anti-tobacco campaign ads are essential in disseminating information about the dangers of tobacco use. One way GHWs and anti-tobacco ads try to accomplish this is by eliciting strong emotional arousal such as fear and disgust. Highly emotional anti-tobacco ads are perceived to be more effective than non-emotional anti-tobacco ads and are important predictors of positive outcomes (i.e. intention to quit, quitting) (S. J. Durkin et al., 2009; Hafstad et al., 1996; Wakefield et al., 2003). However, research on fear-appeals show that they do not always work and are not effective in changing behavior. Therefore the relationship between emotions, particularly those elicited by GWH and other health communications, and tobacco-related cognitions and behaviors are not fully understood.

Fear-appeals

Fear-appeals are highly prevalent in anti-tobacco campaigns (Cohen, Shumate, & Gold, 2007), and thus research on the effectiveness of emotional-appeals in anti-tobacco campaigns is limited to fear-appeals. Fear-appeals are meant to motivate behavior change through persuasive communication (Rogers, 1975; Rogers & Deckner, 1975), however, how people respond to fear-appeals has not always been consistent (Witte, 1992).

An early theory on fear-appeals suggested there was a curvilinear effect whereby moderate fear-appeal messages were ideal in changing outcomes but that too strong a fear-appeal could backfire and produce unintentional consequences such as message avoidance or defensiveness (Janis, 1967). However, in a recent meta-analysis on fear-appeals, moderate fear-appeal messages were just as likely to change outcomes as high fear-appeal messages (Tannenbaum et al., 2015). Other meta-analyses on fear-appeals found demonstrate a positive linear relationship. In these meta analyses, strong fear-appeal messages were more persuasive in changing attitudes, intentions, and behaviors than low or weak fear-appeals (Boster & Mongeau, 1984; Higbee, 1969; Tannenbaum et al., 2015; Witte & Allen, 2000). Despite the fact that the earlier curvilinear model has become less popular as more recent meta-analyses have found less evidence of a curvilinear relationship between fear-appeals and outcomes, these models are still debated within the fear-appeal literature (Meczkowski, Dillard, & Shen, 2016).

Potential issues of why the impact of fear-appeals on outcomes have inconsistent findings is that according to some fear-appeal theories, elicitation of fear arousal is not seen as an important variable in changing attitudes, intentions and behavioral outcomes (i.e. Leventhal's Parallel Response Model (Leventhal, 1970), Roger's Protection Motivation Theory (Maddux & Rogers, 1983; Rogers, 1975), and thus eliciting fear and then measuring elicited fear is not often done. Therefore what is reported in the literature is that fear-appeals do not necessarily have to elicit strong fear responses but can have different degrees of fear arousal. Also, fear-appeals elicit unintentional emotions (i.e. humor) that can sometimes occur more strongly than fear, which can have an impact on fear-appeal effectiveness.

The evolution of fear in fear-appeal theories. Fear arousal as a component in fear-appeal theories has evolved since Janis' approach, which was grounded in learning theory (Hovland, Janis, & Kelley, 1953; Janis, 1967). Janis' theory viewed fear arousal as an important variable in changing outcomes. The fear-as-acquired drive model explained that reactions to fear-appeals were based on the idea that when fear is aroused, an individual becomes motivated to alleviate their fear in adaptive (i.e. attitude and behavior change) or maladaptive (i.e. denial, fatalistic outlook) ways. The action to alleviate the fear is reinforced and then becomes the preferred action to handle similar fear arousing events (Janis, 1967).

What the drive models did not account for was the absence of fear arousal. In response to the inadequacies to the drive model, Leventhal argued that emotional arousal is not a necessary antecedent of changes in attitude, intentions, and behavioral outcomes, and instead stressed the importance of differentiating emotional responses from cognitive responses. His model represented adaptive responses (belief changes and protective health acts) running in parallel and independently to emotional responses (i.e. fear), rather than as consequences of one another (i.e. a serial relationship) (Leventhal, 1970).

Rogers' protection motivation theory added on to Leventhal's cognitive reactions to fear-appeals and offered cognitive mediating processes (perceived susceptibility, severity, response efficacy, and self-efficacy) linking components of fear-appeal messages (magnitude of noxiousness, probability of occurrence, and efficacy of recommendation) to outcomes (Maddux & Rogers, 1983; Rogers, 1975). It was through arousal, which Rogers termed 'protection motivation', that the three mediating cognitive processes would take into effect. Therefore, protection motivation only arises when noxiousness, probability of occurrence, and efficacy are high. All three variables are important and are all required to increase protection motivation. Once this occurs can behavioral intentions change. Thus, emphasis on cognitive processes led to the elimination of the role of fear, the emotion, in Rogers' theory to change attitudes.

However, Witte argued that fear should play a central role in fear-appeal theories and that it is fear control processes that leads to message rejection (Witte, 1992). While Roger's protection motivation theory did well in explaining message acceptance, it failed in providing an explanation for factors that lead to message rejection. What Witte's Extended Parallel Process Model (EPPM) did was expand upon Leventhal's more cognitively focused model to include fear control processes. When fear is mediated by low sense of efficacy, a negative response such as denial (e.g. *Lung cancer will never happen to me*) or reactance (e.g. *They are threatening my freedom to smoke, I'm not paying attention to them*) will be activated. However, when efficacy is high, fear can indirectly influence adaptive outcomes when mediated by perceived threat.

Measuring emotional tone of the message versus elicited emotion. As fear is not always seen as an important factor in fear-appeal theories, empirical studies examining fear-appeal effectiveness rarely measure elicited fear, and instead used self-reported fear, which is inherently retrospective. A meta-analysis on fear-appeal effectiveness reported that only 29% of 248 studies measured elicited fear (Tannenbaum et al., 2015). Rather, most studies use message content (i.e. the emotional tone of the ad) as a proxy for fear and assume respondents felt fear based on the message's content. In studies where elicited fear was measured, it usually is used as a manipulation check, or a

control variable, with no further analyses examining the effects of fear-arousal as an independent variable or mediator (Popova, 2014; Sutton & Eiser, 1984; Tannenbaum et al., 2015). This indicates that rarely is the effect of elicited fear in fear-appeal effectiveness research examined, and thus the effect of elicited fear on outcomes is not fully understood.

Unintended consequences- maybe it was anger, sadness, or disgust. An assumption that respondents feel fear based on the message's content is problematic when messages can elicit other emotions besides fear. In a review of anti-smoking campaign messages, advertisements were more likely to elicit humor rather than fear (Cohen et al., 2007). Other emotions elicited could be sadness (e.g. towards a loved one who died from a smoking-related illness), anger (e.g. towards the tobacco industry), and disgust (e.g. from graphic warning labels). In addition, images of deformed lungs or other bodily parts that are grossly depicted are highly present in anti-smoking ads and cigarette packaging. These images would be more likely to elicit disgust more strongly than fear, and as a result, researchers who assume they are testing the effect of fear might not be getting the intended results.

Emotions and Decision-making

While fear-appeals have dominated health campaigns on risky behaviors, there has been evidence that other emotions and other emotional appeals can have an effect, particularly on decision-making. Additionally, researchers have begun to stress the importance of emotion and its influence on decision-making (Gutnik, Hakimzada, Yoskowitz, & Patel, 2006). This claim is evident within the literature as research on emotions and decision-making have grown rapidly since 2001 (Lerner, Li, Valdesolo, & Kassam, 2015). Even within the field of emotion science there has been a surge in research focused on testing its utility in judgments and decision-making (Lerner et al., 2015). One way decision-making researchers have tested the utility of emotions is by focusing on the attributes of discrete emotions. Specifically, discrete emotions are said to have cognitive appraisal dimensions and core relational themes (Lazarus, 1991; C. A. Smith & Ellsworth, 1985).

Emotions have dimensions and core themes. Each discrete emotion is associated with different patterns of cognitive appraisal, as well as themes (Lerner & Keltner, 2000). Cognitive appraisal dimensions are the evaluations one makes when describing an arousing situation. For example, one may evaluate a situation and ask themselves how pleasant they feel (*pleasantness*), how much attention did the activity draw (*attentional activity*), how much effort is anticipated to handle the arousing situation (*anticipated effort*), was someone other than oneself responsible for the arousing event (*other's responsibility*), was the arousing event triggered by a predictable stimulus (*certainty*), and was the arousing event triggered by someone with control (*controllability*) (C. A. Smith & Ellsworth, 1985). Each emotion can be described using these appraisals and measured along the dimensions of pleasantness, attentional activity, anticipated effort, other's responsibility, certainty, and controllability. Where each emotion lies within the range of each dimension is different for each emotion. Core appraisal themes provide a summary for the relational harm or benefit that underlies the emotion (Lazarus, 1991; C. A. Smith & Lazarus, 1993). In other words, an emotion's

core appraisal theme is one's core assessment (e.g. harm, benefit) associated with the target or elicitor of the emotion.

For example, according to Lazarus, anger's core relational theme is a demeaning offense against me and mine (Lazarus, 1991). Thus anger is triggered when an individual encounters a person or situation that is highly inconsistent with the desires or goals of one's own personal commitments or to relevant issues that they care about (C. A. Smith & Lazarus, 1993). Who or what was responsible for the event is known for certain and the eliciting event occurred under someone's control. Therefore when using some of the cognitive appraisal dimensions above to describe anger, it is rated to be on the higher end of certainty, controllability and other's responsibility, and low in pleasantness (Ferrer, Klein, Lerner, Reyna, & Keltner, 2016). Fear's core appraisal theme is facing existential threats (Ferrer et al., 2016; Lazarus, 1991), and is triggered by an unpredictable stimulus and occurs when there is little individual control. Compared to anger, fear involves low certainty and a low sense of control.

Appraisal Tendency Framework (ATF). These cognitive components of emotion (Lazarus, 1991; C. A. Smith & Ellsworth, 1985) have informed the Appraisal-Tendency Framework (ATF), a theoretical framework linking specific emotions to specific judgment and decision-making outcomes. Specifically, the ATF suggests discrete emotions of even the same valence (e.g. positive emotions such as happiness and joy; negative emotions such as fear and anger) will have differential effects on judgments and decision-making (Ferrer et al., 2016; Lerner & Keltner, 2000), and thus result in different and specific outcomes. This is based on the idea that not only is there a cognitive appraisal and emotion relationship, but that emotions activate a cognitive and motivational predisposition to appraise future events related to its appraisal dimensions and core theme (Lerner et al., 2015). The assessments, or appraisals, made related to certain emotions are what is helpful in motivating future behaviors. This action is referred to as an action tendency.

For example, fear and anger are both negative valenced emotions but have different cognitive attributes that motivate different action tendencies. Fear, which arises from an uncertain situation, has been shown to lead participants to make decisions that enhance certainty or choices that are less risky (Lerner & Keltner, 2000). Anger, on the other hand, arises from certainty and control and evokes risk-seeking choices, even in situations unrelated to the event that caused the anger (Lerner & Keltner, 2000). These two emotions, though of the same valence, not only have opposing cognitive appraisals, but also have opposing outcomes in experimental studies. In a study examining these two emotions alongside one another on risks of terrorist attacks found that fear increased perceptions of risk while anger decreased perceptions of risk (Lerner, Gonzalez, Small, & Fischhoff, 2003).

Sadness and disgust are also both negatively valenced emotions and have different cognitive attributes that motivate different action tendencies. Sadness, another discrete emotion examined within the context of the ATF, is characterized by experiencing irrevocable loss and evokes action tendencies to change circumstances (Lerner, Small, & Loewenstein, 2004), such as acquiring something new. Disgust revolves around the appraisal of being too close to an indigestible object or idea that it evokes an implicit reaction to rid oneself of the current object (can be unrelated to the

induced disgust) and to avoid taking in anything new (Han, Lerner, & Zeckhauser, 2012; Lerner et al., 2004). In other words, sadness increases one's desire to obtain something new, while disgust decreases that desire. An experimental study led by Lerner (Lerner et al., 2004) examined both sadness and disgust on economic transactions. Using a 3 x 2 between-subjects design, participants were assigned to an emotion manipulation (neutral, disgust, sadness) and an ownership manipulation (sell condition, choice condition). Those in the sell condition were given an object with the opportunity to sell back the object for a range of prices, while those in the choice condition were only shown the object and were then asked whether they would prefer to receive the object or to receive various cash amounts instead. (The ownership manipulation is similar for testing the endowment effect, which is the tendency for selling prices to exceed buying of choice prices for the same object. See Kahneman, Knetsch, Thaler, 1991.) Participants in the sadness-choice condition created significantly higher choice prices than those in the sadness-selling condition. Sad participants were more interested in acquiring something new regardless of the price. This was not the case for those in the disgust condition, which showed no significant difference between selling and choice prices. Though those in the disgust-selling condition had the lowest selling prices compared to all other conditions indicating disgusted participants were more interested 'to expel' their own experimental objects, and did so by reducing selling prices.

The Smoking Landscape

Smoking cigarettes accounts for 480,000 deaths in the U.S., and is the leading cause of morbidity and mortality (U.S. Department of Health and Human Services, 2014). While smoking cigarettes have declined, vulnerable populations continue to smoke at high rates (Jamal et al., 2018). In addition, new nicotine products have hit the market resulting in an exponential rise of initiation and use of products such as electronic nicotine delivery systems (Willett et al., 2018). Tackling smoking and use of tobacco products requires continued public health efforts from use of health communications to policy changes.

Graphic health warnings (GHW). Use of graphic health warnings on cigarette packages is an effective strategy in tobacco control efforts to discourage smoking. Canada became the first country to implement graphic health warnings in the early 2000's. These health warnings were in color, sometimes graphic, and covered more than 50% of the front and back of the package. The impact of these graphic health warnings included decreasing smoking, and increasing negative emotional responses that in turn increased quitting and quit attempts (Hammond, Fong, McDonald, Brown, & Cameron, 2004). Australia's plain packaging with enlarged graphic health warnings also showed a positive impact and led to increase intentions to quit and quit attempts (S. Durkin et al., 2015). Similarly in other countries, graphic health warnings decreased demand in smoking in Vietnam (Van Minh et al., 2016), increased avoidance of cigarette packs and quitting behaviors in Malaysia (Li et al., 2016), and increased cognitive reactions (thoughts about the harms of smoking and thoughts about quitting) and behavioral reactions (forgoing of cigarettes and avoidance) to labels in both Thailand (Yong et al., 2013) and Uruguay (Gravely et al., 2014).

Cigarette smoking is declining

Cigarette smoking prevalence in the U.S. has been on the decline. In 1965 42.4% of adults smoked cigarettes compared to 16.8% as of 2014 (Centers for Disease Control & Prevention, 2016). Contributions of the decline are attributed to tobacco control programs, anti-smoking campaigns and policies that include taxation of cigarettes, education, and legislation to ban smoking. In California, the first state to enact a statewide smoking ban in 1995, has implemented smoke free laws in many places including schools, workplaces, child day care centers, multi-unit housing, and personal vehicles (California Department of Public Health, 2017). In 1989 California's comprehensive tobacco control program began, and from 1988 to 2014 the decline in smoking prevalence dropped from 23.7% to 11.6% (California Department of Public Health California Tobacco Control Program, 2016). With such laws the exposure to secondhand smoke had also decreased (Tynan et al., 2016).

Public health challenges for smoking and tobacco products remain

Roll out of graphic health warnings by the United States Food and Drug Administration have been delayed in the U.S. since its mandate in 2009. This is due to several attempts by tobacco companies to challenge the mandate. One argument made by the tobacco industry in regards to GHWs was that the "…graphic images were chosen not to convey information, but to evoke negative emotions and thereby discourage smoking" ("R.J. Reynolds Tobacco Co., et al., v. Food & Drug Administration, et al.," 2012). In 2012, the tobacco industry successfully appealed the mandate and thus impeded the health communication effort.

The disparities in smoking is another public health challenge. While tobacco control programs have been successful in decreasing cigarette consumption, there are vulnerable populations (i.e. people with low education, people who live below the poverty level) and segments of the U.S. (i.e. people living in the south and Midwest) that continue to have high rates of smoking (Jamal et al., 2018). In addition, there remain many loopholes in policies on smoking restrictions. In California smoking policies prohibit smoking in enclosed places of employment. Yet places such as hotel rooms, private residences, retail tobacco shops and lounges, and patient smoking areas in long-term health facilities are exempt from the smoking ban law (ChangeLab Solutions, 2016). The workplace smoking ban applies to multiunit residencies in areas where places of employment occur (i.e. areas where a maintenance worker or security guard works such as hallways or laundry room). It is then up to the discretion of landlords or housing associations who may adopt further smoking restrictions. Section 8 housing is exempt from this rule. Also, compliance of smoking bans is not always adhered to and enforcement is not always properly handled.

Moreover, secondhand smoke exposure remains a problem. In a study of U.S. adults in 2014, 69% of the sample reported tobacco smoke exposure outside their home in the past 7 days. Among the sample, 33% of parents reported tobacco smoke exposure for their children with the most common place for exposure being in a car (Torok, Winickoff, McMillen, Klein, & Wilson, 2017). In the same study, tobacco smoke exposure was also reported outside of buildings and on the sidewalk, in front of multiunit housing, and at the workplace (Torok et al., 2017). In general, attitudes towards smoke-

free policies vary by the location of the smoking ban. In one study, majority of the sample supported smoke-free convenience stores (93.5%), fast food restaurants (91.0%), restaurants (79.6%) and shopping malls (84.1%) (McMillen, Wilson, Tanski, Klein, & Winickoff, 2018). Though in terms of policies for public parks, among U.S. adults only 38.5% support complete smoke-free parks (Kruger, Jama, Kegler, Marynak, & King, 2016). Among households with children and 1 or more smoking parent, 84.6% supported complete smoke-free policy in cars when children are present, but only 60.1% had established a voluntary smoke-free policy inside their home (Zhang, Martinez-Donate, & Rhoads, 2015). For the most part, smoke-free attitudes and smoke-free policies have increased. However, strong public support and advocacy for smoke-free public areas is linked with the local and statewide smoke-free legislation, with stronger support among those who live in places that already have smoke-free policies implemented (McMillen et al., 2018). The question then becomes: what factors influence support for policy changes around smoking?

Can emotions influence policy preferences?

Emotion has been shown to be significant factor in influencing policy decision-making (Lerner et al., 2003; Nabi, 2003; N. Smith & Leiserowitz, 2014). Emotion on policy preference, in particular, has shown that policy preferences are not necessarily fixed beliefs but can be shaped by information, especially information that is highly emotional. In Lerner's study on the effects of fear versus anger on risk of terrorism threat perceptions, participants in the anger condition were more in favor of punitive policies (i.e. deport foreigners in the U.S. who lack valid visas) than those in the fear condition, who were more in favor of conciliatory policies (i.e. strengthen ties with countries) (Lerner et al., 2003). Based on Lerner and colleagues' earlier works (Lerner & Keltner, 2000), they were not surprised by these results, especially in regards to anger. Anger reduces one's sense of risk, increases engagement of heuristic information processes (or more simple thinking), and increases willingness to act aggressively and activate blame cognitions (Lerner, Goldberg, & Tetlock, 1998; Lerner & Tiedens, 2006). Therefore the fact that participants in the anger condition were more likely to favor punitive policies than conciliatory policies is in line with anger's core dimensions and action tendencies.

What about prevention?

Health perceptions. Perceptions of health risk of smoking play a very important role in smoking initiation. In a study of adolescents, those who perceived smoking-related risks to be low were 2 to 3 times more likely to initiate smoking than those of high perceived smoking-related risk (2.68 for short-term risks and 3.64 for long-term risks) (A. V. Song, Morrell, et al., 2009). Furthermore, those who perceived smoking-related benefits to occur were more likely to start smoking (A. V. Song, Morrell, et al., 2009). Perceptions of second-hand smoke risks has also been found to predict smoking initiation, where those who held high perceptions of second-hand smoke risk were less likely to smoke a cigarette (A. V. Song, Glantz, & Halpern-Felsher, 2009).

Perceptions of responsibility is important in public health because when people attribute some blame for health problems beyond the individual and to society and environmental factors, they are more likely to support change in public policies and institutional practices (Chapman 2001), which are important factors in addressing health problems (Coleman 2011). So while perceptions of responsibility is an important factor in consumer behavior (Wells 2011, Kaiser and Shimoda 1999), research on its effects is limited to a narrow set of fields (i.e. climate change or environmental studies). In terms of climate change, perceptions of responsibility (i.e. individual responsibility, government responsibility) were associated with consumer's environmental-related behaviors (i.e. recycling, greener travel) (Wells 2011). Specifically, perceiving government responsibility for climate change decreased individual pro- environmental behavior; individual responsibility for causing climate change was associated with more pro-environmental behavior; and wanting to switch to companies that worked to reduce climate change was linked to increased environmental behaviors (Wells, 2011). In general not much has been done on perceptions of responsibility within a health context, and those that have mainly focused on how media framing can influence perceptions of responsibility (Coleman 2011, Mello 2016). Therefore, not much is known about people's perception of responsibility around smoking, and more so, whether emotions can effect these types of perceptions.

ATF and Smoking Prevention. Based on the ATF it is plausible that within the context of smoking, discrete negative emotions would evoke specific smoking-related outcomes (i.e. increase risk perceptions, increase intentions to quit). Cigarette campaigns have been pervasive in their attempts to portray smoking as being socially acceptable. Conveniently they leave out the life threatening diseases associated with smoking such as cardiovascular disease and cancer. GHWs and anti-smoking campaigns use of fear-appeals has been useful in disseminating information about these ill health effects of smoking. However, as previous literature has shown, fear-appeals do not always work.

Dissertation

GHWs and anti-tobacco ads have relied on fear to decrease smoking. It is plausible that other emotions can effect people's smoking-related judgments and decisions, and understanding these relationships can be helpful in developing effective anti-smoking communications. Furthermore, I seek to understand not only how emotions effect outcomes on an individual level (i.e. prevent smoking uptake and promote smoking cessation), but also at the policy level (i.e. vote for smoking bans). In this dissertation project I explored how discrete emotions influence smoking-related outcomes on multiple ecological levels. Specifically, I conducted three studies: (1) I conducted a systematic literature review on the current evidence of the effect of four discrete emotions (fear, anger, disgust, sadness) on smoking-related outcomes (i.e. intentions, behavior); (2) I tested causality of elicited emotions on smoking-related judgments by conducting an experimental study; and (3) I examined the association of discrete emotions, smoking ban attitudes, and sociodemographics on smoking ban advocacy intentions.

Chapter 2

Paper 1: Are smoking-related cognitions and behaviors affected by emotions?
A systematic review of the impact of discrete emotions on smoking-related outcomes in public health interventions.

**Are smoking-related cognitions and behaviors affected by emotions?
A systematic review of the impact of discrete emotions on smoking-related outcomes in public health interventions.**

Abstract

Graphic health warnings and anti-smoking campaigns have relied on fear in order to relay the health consequences of smoking. According to the Appraisal Tendency Framework (ATF) different discrete emotions (i.e. fear, anger, sadness, and disgust) can influence judgments and decision-making in different ways. Therefore it is plausible that emotions elicited by antismoking campaigns, beyond fear, can be helpful in discouraging people to smoke. Furthermore, use of different emotional-appeals in anti-smoking ads can keep messages novel and effective. The purpose of this systematic literature review is to examine the impact of discrete emotions (e.g. fear, anger, disgust, and sadness) on smoking-related cognitions and behaviors. Key words used to search two databases were: *emotion(s), fear, sad, anger, disgust, appraisal, smoke(ing), tobacco, cigarette(s), communication(s), ads, and graphic warning labels*. A total of thirteen studies fit inclusion criteria and were included in this review. Among the thirteen studies, most examined the effect of fear (n=12), followed by anger (n=2), disgust (n=2), and sadness (n=1); methods ranged from experimental (n=11) to cross-sectional (n=1) to longitudinal study designs (n=1); and outcome variables included smoking-related intentions and behaviors and anti-smoking ad perceived effectiveness. Study results reveal a positive trend of fear on smoking-related intentions in nonsmokers, anger impacts attitudes towards indoor air policies, disgust is important in ad effectiveness, and sadness increases intentions to quit smoking. A lack of consensus exists for fear and its effect on other smoking-related outcomes. More studies on the effect of discrete emotions on smoking-related intentions and behaviors are warranted to ensure anti-smoking campaigns remain effective.

Graphic health warnings and anti-smoking campaigns have relied on fear in order to relay the health consequences of smoking. According to the Appraisal Tendency Framework (ATF) different discrete emotions (i.e. fear, anger, sadness, and disgust) can influence judgments and decision-making in different ways. Therefore it is plausible that emotions elicited by antismoking campaigns, beyond fear, can be helpful in discouraging people to smoke. Furthermore, use of different emotional-appeals in anti-smoking ads can keep messages novel and effective. The aim of this study is to conduct a systematic review on the current literature of 4 discrete emotions (fear, anger, disgust, and sadness) on smoking-related cognitions (i.e. intentions to quit) and behaviors (i.e. smoking cessation). To my knowledge there are no studies that have examined the collective literature of how smoking outcomes are affected by discrete emotions. Understanding these relationships can be helpful in developing effective anti-smoking communications.

Methods

Search Strategy

Two electronic datasets, PubMed and PsycINFO, were used to search for published literature on the effect of emotions on smoking-related cognitions and behaviors. Search strategy was: *(emotions OR fear OR sad OR anger OR disgust OR emotion OR appraisal) AND (smoke OR smoking OR tobacco OR cigarette OR cigarettes) AND (communication OR ads OR graphic OR "graphic warning label" OR GWL).* Searches were filtered to studies in English and to exclude studies on animals.

Inclusion and exclusion criteria

Studies included in this review were until August 2017. There was no timeframe included in the search. Criteria for inclusion in the review were: (1) assessment of a discrete emotion; (2) analysis had to include a discrete emotion as an independent or exposure variable; (3) analysis had a cognitive or behavioral smoking-related outcome; and (4) English language. Studies were excluded if: (1) valance, mood states, or affect (i.e. positive or negative affect) were measured rather than a discrete emotion; (2) emotion was measured using a composite score of more than 1 discrete emotion (e.g. a fear measure based on fear and disgust) or discrete emotion was operationalized as a mood state; (3) observed emotion measured (i.e. facial recognition); (4) emotion was the outcome variable or the emotion was assessed only to check whether the manipulation worked; (5) cognitive or behavioral outcome was not smoking related; and (6) article was a commentary, book chapter, review, or dissertation. As indicated in the search strategy, research on humans and articles written in English were specified. Resources on translating articles not in English were not available.

Data extraction

An initial review of titles was conducted to ascertain articles' relevancy. Relevancy was categorized and coded in the following ways: (1) Relevant Titles were titles that included specific words such as emotion, fear, and tobacco; (2) Somewhat Relevant Titles were titles that did not include specific words but used "effect", "reaction", "response", "type" rather than "emotion" and had a smoke-related word or "ad" or "graphic warning"; (3) No Smoke-related were titles that did not include any smoke- or tobacco-related word; (4) No Emotion-related were titles that did not include any emotion-related word; (5) Smoke and Emotion words but unrelated were titles that did include a smoke- and emotion- related word in the title but also included an unrelated topic (i.e. Stroop Task); and (6) Unrelated were titles that did not include any smoke- and emotion- related word in the title. Titles that were not smoke related, not emotion related, had smoke and emotion words but unrelated, and were unrelated were all considered irrelevant to this review and therefore excluded. Abstracts of relevant and somewhat relevant titles were then screened to verify if inclusion criteria was met. For those that did, the corresponding articles were extracted and read to further verify if inclusion criteria was met. Articles that met inclusion criteria were included in this review.

Results

Search results

PubMed database search yielded 251 articles and PsycINFO database yielded 249 references. With a total of 500 references, 82 were duplicates, 316 had irrelevant titles, and 56 abstracts were excluded for not meeting inclusion criteria. Of these 46 that were determined potentially relevant and their abstracts reviewed, 13 articles met inclusion criteria and were included in this review. See Figure 2.1 for the flow chart of reviewed articles.

Study characteristics

See Table 2.1 for detailed descriptions of the studies included in this review. Among the 13 articles in this review, the most commonly examined emotion was fear (n=12), followed by anger (n=2), disgust (n=2), and sadness (n=1). All studies measured emotions by using a Likert scale (see Appendix A for description of how emotions were assessed), with most using more than 1-item to assess emotion and then averaging responses into a composite score that was used for analyses. Emotions were assessed after participants were exposed to or asked about an anti-smoking ad (video, print ad, or cigarette warning label) or when asked how they felt around cigarette smoke from another person. Anti-smoking ads used were either FDA proposed warning labels, ads from U.S., British, or Canadian national campaigns, ads found online, modified anti-smoking ads that included images and warnings from national anti-smoking campaigns, or ads completely designed by the researchers for the purpose of their study (see Appendix B for more details on the anti-smoking ads used in each study).

Study design and aim varied as well (See Table 2.1). Eleven studies used an experimental approach, one used a cross-sectional design and examined the association of anger feelings when around secondhand smoke on secondhand smoke policies (Quick et al. 2009), and another study used a longitudinal design to assess adult smokers living in Ontario and their emotional reactions to cigarette warnings 9 months after they were introduced on Canadian cigarette labels, and changes in smoking behavior 12 months thereafter (Hammond et al., 2004). Four of the experimental studies' aims were to examine the effect of emotional-appeal ads (Jónsdóttir, 2014; Shen, 2011; Sutton & Eiser, 1984; Timmers & van der Wijst, 2007), three examined the effects of graphic warning labels (Byrne, Katz, Mathios, & Niederdeppe, 2015; Cameron, Pepper, & Brewer, 2015; Kees, Burton, Andrews, & Kozup, 2010), two examined the effects of message framing (Kang & Lin, 2015; Wong, Harvell, & Harrison, 2013), and two examined fear and cognitions on smoking outcomes (Popova, 2014; Sutton & Hallett, 1989).

Characteristics of the samples were mostly adults. Only one study included adolescents (12 to 18 years of age), as well as adults (Timmers & van der Wijst, 2007). This study aimed to examine the difference between youth and adults' emotions on behavioral intentions, however no differences were found. Age range was 12 to 90 years. Study location varied from U.S., Canada, England, Korea, and The Netherlands. Recruitment strategies included recruiting online through a recruitment research company, recruiting college students enrolled in a class, recruiting employees in a company, and through random digit dialing.

No one type of theory guided these studies. In this review, two studies made no reference to a theory (Hammond et al., 2004; Jónsdóttir, 2014). Theories that guided the other studies were the extended parallel process model (Byrne et al., 2015; Popova, 2014; Timmers & van der Wijst, 2007), protection motivation theory, expectancy-value model (Sutton & Eiser, 1984), common-sense model (Cameron et al., 2015), gain-frame and loss-frame theory (Kang & Lin, 2015; Wong et al., 2013), and psychological reactance theory (Quick, Bates, & Quinlan, 2009; Shen, 2011). Two studies referenced multiple fear appeal theories (Kees et al., 2010; Sutton & Hallett, 1989).

Smoking-related outcomes

Smoking-related outcomes varied (See Table 2.2); with the most common outcome being intention to quit smoking (n=6) (Byrne et al., 2015; Kang & Lin, 2015; Kees et al., 2010; Sutton & Eiser, 1984; Sutton & Hallett, 1989; Timmers & van der Wijst, 2007) and perceived ad/warning label effectiveness (n=4) (Byrne et al., 2015; Hammond et al., 2004; Jónsdóttir, 2014; Shen, 2011). Other outcomes included changes in smoking behavior (n=1) (Hammond et al., 2004), quit attempts (n=1) (Sutton & Eiser, 1984), discouragement from smoking (n=1) (Cameron et al., 2015), attitudes to support tobacco control policies (n=1) (Quick et al., 2009), optimistic bias toward smoking consequences (meaning the cognitive tendency to underestimate the likelihood of experiencing smoking-related health consequences; n=1) (Kang & Lin, 2015), anti-smoking message rejection (n=1) (Popova, 2014), and intentions to talk to friends who smoke to quit (n=1) (Wong et al., 2013).

Smoking-related intentions and discouragement from smoking. Six studies examined discrete emotions on smoking-related intentions and one examined the emotional effect on discouragement from smoking. Results indicated fear and sadness have a beneficial effect on intentions and discouragement from smoking, but that anger does not have an effect on intentions. The one study that examined the effects of sadness found that sadness predicted intention to quit smoking after viewing a pictorial warning on the risk of harming other people and on the risk of a mouth disease (Timmers & van der Wijst, 2007). Fear-related reactions from viewing GWLs were associated with greater discouragement from wanting to smoke (Cameron et al., 2015). In studies on nonsmokers, fear increased intention to talk to friends who smoke about cessation (Wong et al., 2013), and decreased intention to try a cigarette (Timmers & van der Wijst, 2007). However, when examining the effect of anger in nonsmokers on intentions to talk to friends who smoke about quitting, the effect was not significant (Wong 2013).

Three studies on smokers showed fear elicited from anti-smoking communications significantly increased intention to quit smoking (Kees et al., 2010; Sutton & Eiser, 1984; Sutton & Hallett, 1989). Though in Kang and Lin's study on smokers, the effect of fear on smoking cessation intentions were not consistent. In their study, fear was assessed pre- and post- exposure to anti-smoking ads (Kang 2015). In the pre-test, where no experimental stimulus was given, fear based on prior exposure to antismoking ads was associated with baseline cessation intentions. Exposure to the researcher's anti-smoking ads increased participant's fear level, however, post-exposure fear was not significant in predicting cessation intentions assessed post-exposure (Kang 2015). Kang and Lin concluded that such high fear contributed to message backfiring and therefore no longer predicted cessation intentions. Such conclusions are in line with the curvilinear model of fear-appeals that predict moderate levels of fear is optimal in changing outcomes and that too high a fear-arousal can lead to unintended consequences such as message rejection.

Behavioral outcomes. The studies that examined the effect of discrete emotions on behavioral outcomes had contradictory results. Sutton and Hallett found that fear did not have a significant effect on quit attempts at follow-up (Sutton & Hallett, 1989), while Hammond et al. found fear and disgust independently increased the likelihood of changes in smoking behavior (i.e. quit attempts, quitting) (Hammond et al., 2004).

Perceived effectiveness and message rejection. Studies showed different results for evoked fear and positive effects of evoked disgust on perceived effectiveness of GWLs and anti-smoking ads. A study that tested the effectiveness of anti-smoking ad messages found that among smokers and recent quitters (i.e. quit within 2 years), fear elicited from the ads increased ad message rejection where participants felt ads were exaggerating the health consequences and felt the ad was trying to manipulate their feelings (Popova, 2014). On the other hand, in Jonsdottir et al.'s study of young adults who were mostly non-smokers (84%) and female (60%), fear elicited from anti-smoking ads from CDC's Media Campaign Resource Center positively increased perceived ad effectiveness (Jónsdóttir, 2014). Similarly, Shen et al.'s study of college students who were mostly nonsmokers (86%) and mostly female (66%) as well, found induced fear elicited from televised anti-smoking PSAs had a positive effect on perceived effectiveness (e.g. convincing, believable) on PSAs (Shen, 2011). Though there was an

imbalance between smokers and nonsmokers and males and females in Jonsdottir et al.'s (Jónsdóttir, 2014) and Shen et al.'s (Shen, 2011) studies, both studies controlled for sex and smoking status in their analyses and thus the imbalance should not have biased their findings (Shen, 2011). Two studies reported that post-exposure disgust was independently associated with perceived ad/message effectiveness (i.e. message was important to me, ad made me think about my health, the labels reduced the amount of cigarettes smoked) (Hammond et al., 2004; Jónsdóttir, 2014).

Optimistic bias and attitudes toward clean indoor air policies. Discrete emotions had a positive effect on smoking-related optimistic bias and attitudes. One study examined the effect of fear on optimistic bias, the cognitive tendency to underestimate the likelihood of experiencing smoking-related health consequences. Results showed that fear measured at baseline was associated with optimistic bias after exposure to an anti-smoking ad (Kang & Lin, 2015). In Quick et. al.'s study, expressed anger toward secondhand smoke had a positive association on favorable attitudes toward clean indoor air policies (Quick 2009).

Discussion

The purpose of this review was to get a better understanding of the effects of fear, anger, disgust, and sadness on smoking-related outcomes. A systematic review of the literature found thirteen articles that examined the effects of discrete emotions on smoking-related cognitive and behavioral outcomes. Results showed discrete emotions have differential and useful effects on smoking-related cognitions. Specifically, fear and sadness have beneficial effects on smoking-related intentions, anger is linked to favorable attitudes toward clean indoor air policies, and disgust is helpful in increasing message/ad effectiveness.

More studies on disgust, anger, and sadness are warranted

Anti-smoking ads elicit an array of emotions such as fear, anger, sadness, and disgust, as well as frustration, surprise, and even puzzlement (Timmers & van der Wijst, 2007). However, this review found that not many studies examined the effect of other emotions besides fear.

In particular, it is interesting that disgust is not more prevalent in this review, or ignored in studies that used deformed lungs to elicit fear. The two studies that did examine disgust analyzed its effect on ad effectiveness and not on intentions to quit or quitting behavior. Disgusting images such as deformed lungs or rotting teeth are found on graphic warning labels of cigarette packages, and yet the three studies specifically aimed to examine the effects of graphic warning labels only examined the effects of fear. Disgust elicits disposal or a pushing away tendency (its core relational theme) (Lazarus, 1991) and therefore disgust could be a relevant factor in getting people to quit or 'expel' their cigarettes. Thus more research is needed to fully understand how disgust in GWLs can motivate intentions to quit or quitting behavior.

Understanding the effect of anger on smoking-related outcomes was limited. The two studies that focused on anger directed their studies to non-smokers and examined the effect of anger from secondhand smoke. The positive effect anger had on clean indoor air policies suggests that anger could be useful in getting people together to advocate for policy changes. Rather than just use anti-smoking communications to inform about the health risks of smoking, anti-smoking communications should use anger-appeals to advocate for tobacco-related policies. Anger arises from certainty and control (Lazarus, 1991) and could motivate seeking changes from the status quo. Furthermore, tobacco companies are certainly responsible for cigarette consumption and a likely entity that would promote anger from smokers and nonsmokers alike. However no study in this review utilized messaging related to tobacco companies' nefarious strategies to lure people to smoke. Researchers should examine the emotional effect of messaging about tobacco company strategies and test if there would be an effect on smoking-related policies and other outcomes.

Only one study examined the effects of sadness. Though findings from Timmers & van der Wijst show a positive effect of sadness on intentions to quit, more studies are needed to determine whether sadness-appeals can be effective in changing outcomes. Sadness is characterized by loss and evokes tendencies to change circumstances. Therefore it is possible that sadness from a loss of a loved one due to a smoking-related disease would influence one to quit smoking or talk to people who smoke to quit. Therefore it would be worthwhile for more research on sadness to determine if it has an effect on intentions in nonsmokers and can affect quitting behavior in smokers.

As can be seen here, the research on disgust, anger, and sadness are scarce and whether disgust-, anger-, and sadness appeals affect smoking-related outcomes remains to be fully understood. The appraisal tendency framework provides a framework to investigate the effect of discrete emotions on smoking-related outcomes, and opens the door to other investigations of discrete emotions on smoking-related outcomes that could be important in motivating people to quit and getting people to advocate for policies.

Comparing emotional-appeals

The aim of this review was to examine the effects of four discrete emotions that were most common in anti-smoking ads. Though this is not to say that other emotional-appeals would not be useful. Consideration of empathy in antismoking ads is a novel approach from the mostly negatively valenced emotions (i.e. fear, anger, disgust) that are usually examined. Shen's previous studies (Shen, 2010a, 2010b) laid the groundwork for the usefulness of empathy as a persuasive tool due to its ability for recipients to perceive, recreate, and vicariously relive the experiences of others (Shen, 2015) and thus understand and adopt the perspective in a message. Empathy is negatively associated with psychological reactance, which indicates that empathy messages would be less likely to be rejected, whereas fear has a positive association with psychological reactance. When Shen compared the effects of empathy and fear messages, results indicated that empathy-appeals held an advantage over fear-appeals in perceived ad effectiveness (Shen, 2011). However, in Shen's 2015 article, empathy appeals no longer held an advantage over fear-appeals in ad effectiveness (Shen, 2015). Both empathy- and fear-appeals were more effective than the control messages, which supports the notion that

indeed messages high in emotional intensity are more persuasive. While empathy-appeals did not remain to have an advantage over fear-appeals in a general population, the advantage did remain for women illustrating that empathy-appeals could still be an effective tool when targeting women's cognitions and behaviors around smoking. Shen's work is just one example of the use of other emotional-appeals besides fear and its potential in improving health outcomes.

Limitations and implications for future work

In this systematic review, there were a small number of studies that met inclusion criteria from the two databases that were searched. Though the study of discrete emotions on health-related decision-making is in its infancy and therefore adding more search databases may not have produced more relevant results.

With the majority of studies in this review experimental, it should be taken into account that some of the experimental studies failed to either conduct a manipulation check of their stimuli or at least pre-test their stimuli to ensure its desired effect. Therefore whether or not results from these experimental studies can be replicated is unclear. Stimuli used varied from study to study and how stimuli were derived varied as well. Most studies in this review, utilized a bottom-up strategy in developing their messages. This is done with anti-smoking ads undergoing a pre-test where participants are asked to rate the messages (e.g. emotional intensity) and give their evaluation of the ad. Such practices allow researchers to modify and further refine an ad and its message. This 'bottom-up' strategy in message development is similar to how many public health interventions are developed. 'Bottom- up' refers to the message development that begins with consultation of many stakeholders (i.e. community members, smokers, non-smokers), whereas a 'top-down' approach would be a decision made by one person such as an executive decision maker (i.e. public health researcher). While such methods are appropriate and based on empirical findings, message development is rarely based on a specific theory (Popova, 2014), which can make replicating study effects difficult.

Majority of the studies in this review examined the effect of fear. In general fear arousal, compared to no emotion, can be more helpful in discouraging people to smoke. Though at times the results are not always consistent. The evidence of fear on ad persuasiveness and motivating quitting and quit attempts in smokers is mixed. Possible reasons for the discrepancies may be due to the different types of fear assessed and how fear was measured. In this review depicted fear (e.g. *The images I just viewed are frightening)* as well as elicited fear were assessed (e.g. *How frightened did you feel while watching the film)*. Though even in instances where elicited fear was assessed, the number of items used varied from one-item (e.g. How much fear was felt looking at the ad) to seven-items (e.g. How frightened, tense, worried, nervous, scared afraid, anxious was felt while watching the film). On top of this, most studies did not use a validated measure of fear. Also, not all studies in this review aimed to examine the effect of emotion on outcomes and thus methodology used, sample size, stimuli used, and assessment of the emotion and outcome variable may not have been appropriate to detect an effect. Another limiting factor is that all data collected on behavioral outcomes were self-report. The two studies in this review that examined the effect of fear on behavioral outcomes collected self-report data at follow-up on changes in smoking behavior (i.e. quit

attempts, quitting). While self-report data is considered reliable, in terms of quitting smoking cigarettes, including biochemical verification would have been helpful in confirming the self-report data. Overall, while most research on discrete emotions focus on fear, inconsistent results warrant the need for more directed research on the effect of fear on specific smoking-related cognitions and behaviors.

While heterogeneity exists making comparisons between studies difficult, the findings from this review are notable. This review adds to the emotion literature and health behavior research in that it is the first to review the available literature of discrete emotions fear, anger, disgust, and sadness on smoking-related outcomes. Trends in the research show fear has a positive effect on intentions and disgust is important in ad effectiveness. Individual studies demonstrate anger can influence attitudes on smoking policies but has less of an effect on people's intentions to speak to friends who smoke about quitting; and sadness is helpful in increasing intentions to quit in smokers. There is a lack of consensus of the effect of fear on quitting smoking, however, more studies examining the effect of discrete emotions on smoking behavior using self-report accompanied by biochemical verification can remedy the disagreement between results. There has been an increase in research on emotions in decision-making, with results showing discrete emotions having differential effects in decision-making. However not much has been done examining emotions and decision making within a smoking context.

Furthermore, there were no studies that reported on the effects of emotions on risk perceptions. Research examining the effect of emotions on risk perceptions would be useful as risk perceptions is considered a main component in behavior change interventions (Ferrer et al., 2016). There were also hardly any longitudinal studies. Emotional-appeals should be tested longitudinally to determine long-term effects of decreasing smoking. Another way to test the effect of emotional-appeals in anti-smoking ads is with social media. With the use of social media, anti-smoking communications can reach a broad range of people, and can be a mode to investigate the effect of emotional-appeals on advocating for smoking-related policies. Addressing these gaps in research will increase understanding of the effects of discrete emotions within a smoking context and will be useful for prevention efforts such as developing effective anti-smoking campaigns.

Conclusion

Tobacco control requires a huge public health effort to decrease the burden of disease related to smoking. Across the country and around the world messages regarding the health effects of tobacco use are widespread. Images within antismoking advertisements and graphic warning labels are ubiquitous. However, tobacco use remains a legal substance and its use still prevalent in many communities, with those who are most disadvantaged suffering most from its ill effects.

Understanding the effects of emotion in decision making and judgments within a smoking context is one way to help make effective anti-smoking ads, though not much research has been done in this area. Emotional based anti-smoking ads are more likely to be recalled than other ads, and higher recall increases probability of making a quit attempt (Leas, Myers, Strong, Hofstetter, & Al-Delaimy, 2015). Though rarely are discrete emotions elicited from viewing the ad assessed (Leas et al., 2015) and rarely are the effects of discrete emotions on smoking-related outcomes examined (Noar et al., 2016).

Health communications seek to inform. Although, no longer is there just a need to inform smokers of the health consequences or to convince young people to not start smoking. Health communication, as evident in this review, seeks to also inform, as well as empower, those who are not smoking to advocate for clean indoor air policies and support tobacco control policies. Anger seems to be a well-placed emotion to motivate such intentions and behaviors.

This need to fully understand the effect of discrete emotions on smoking-related outcomes is highly relevant in light of the fact that smoking can lead to many health threats (i.e. cancer diagnosis) and clinical care contexts (i.e. cancer treatments) that evoke strong emotions (Ferrer et al., 2016). While fear is a common emotion expressed in these situations, other emotions are also aroused. Knowing how specific emotions can influence decision-making is useful for clinicians when talking to their patients about their health and treatment options and for health researchers when designing interventions to tackle risk behaviors and for promoting healthy lifestyles.

To use the term ‘fear-appeal’ implies that we may want to motivate behavior change by ‘scaring’ one to change. Is that really the solution though? Increasing knowledge of the health consequences of tobacco use, providing motivation, and increasing efficacy seem to be more of the obligation of the public health field and probably the more sustainable solution. But how can one persuasively communicate these messages to the masses? Fear may work to ensure that people do in fact know the dangers, but what happens when it is not fear that people are experiencing when they are face-to-face with advertising messages. What happens when fear leads the audience to put up their defenses due to their perceived threat to freedom and then reject the message? The results show that the outcome can be variable. More research is needed to fully explore discrete emotions and their effect in smoking related risk perceptions, intentions, and behaviors.

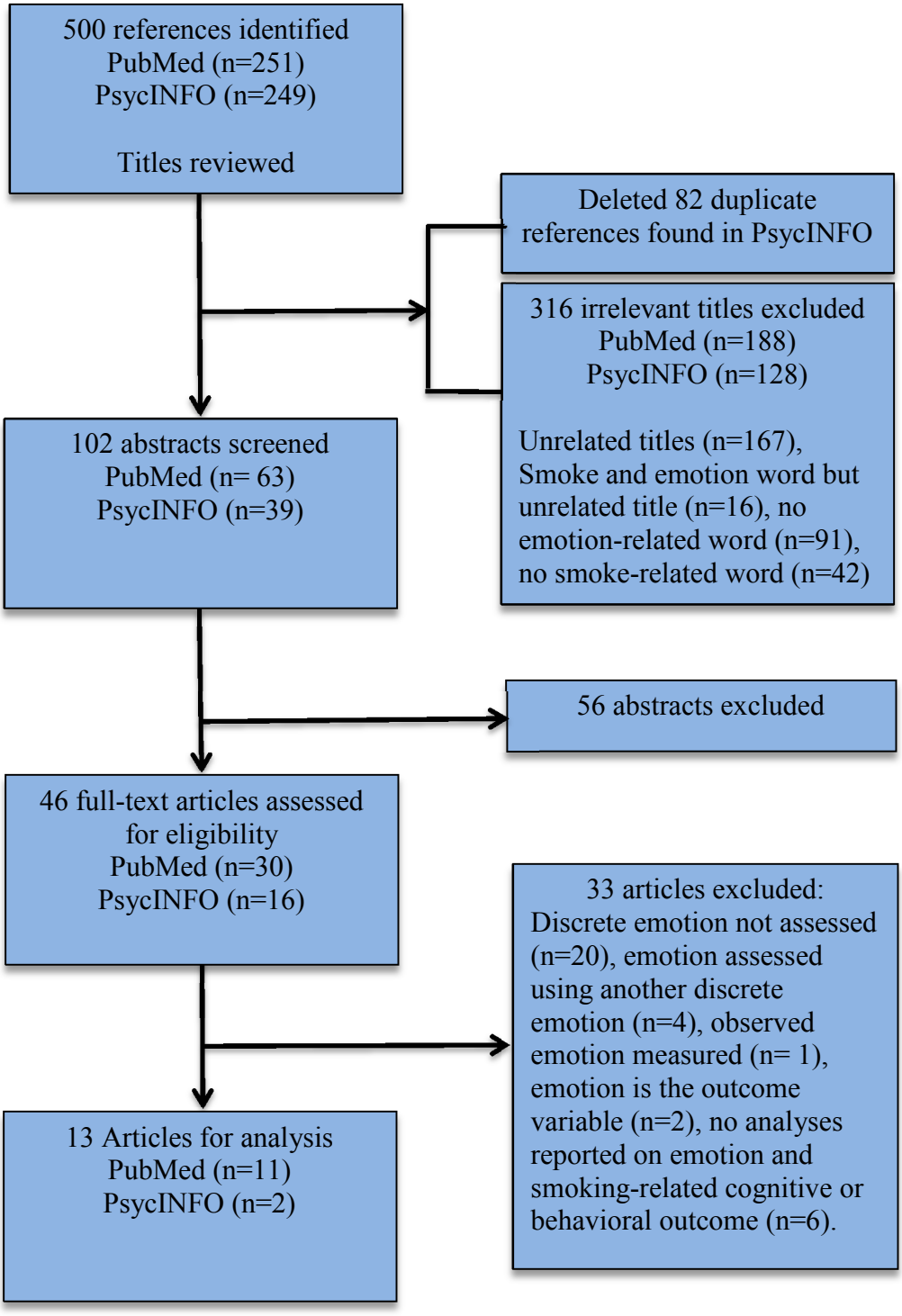


Figure 2.1 Flow Chart of Articles Reviewed

Table 2.1 *Descriptive Table of Studies*

Author Year	Population	Age	N	Study aim	Theory used								Emotion				Study type		
					EPPM*	Psychological reactance	PMT*	Gain-loss framed	Expectancy value	CSM*	Mult. fear-appeal theories	None	Fear	Anger	Sadness	Disgust	Experimental	Cohort	Cross-sectional
Byrne et al. (2015)	Nonsmoking Northeastern university students and daily smokers from throughout the U.S.	18-67	399	FDA proposed warning labels versus others	x								x				x		
Cameron et al. (2015)	Adults throughout the U.S.	18-30	308	FDA proposed warning labels versus others						x			x				x		
Hammond et al. (2004)	Adult smokers (18+) living in southwestern Ontario	18+ (M=39)	616	The effect of graphic warning labels								x	x			x		x	
Jonsdottir et al. (2014)	Students at a Midwestern university	19-33	144	Emotions (fear and disgust) on ad effectiveness								x	x			x	x		
Kang & Lin (2015)	Korean adult males	30's	125	The effect of gain- and loss-framed messages			x	x					x				x		

**Note:* EPPM: Extended Parallel Process Model, PMT: Protection Motivation Theory, CSM: Common Sense Model

continued Table 2.1 *Descriptive Table of Studies*

					Theory used								Emotion				Study type		
Author Year	**Population**	**Age**	**N**	**Study aim**	**EPPM***	**Psychological Reactance**	**PMT***	**Gain-loss framed**	**Expectancy Value**	**CSM***	**Mult. fear-appeal theories**	**None**	**Fear**	**Anger**	**Sadness**	**Disgust**	**Experimental**	**Cohort**	**Cross-sectional**
Kees et al. (2010)	Undergraduate students and adult smokers throughout the U.S. and Canada	19-79	646	The effect of graphic warning labels							x		x				x		
Popova (2014)	Adults throughout the U.S.	18-84	1836	Fear & cognitions on smoking outcomes and message effectiveness	x								x				x		
Quick et al. (2009)	Adults living in a Midwestern county	18-90	550	Anger on outcomes		x								x					x
Shen (2011)	Students at University of Georgia	College-aged (M=19.5)	260	Fear-appeal versus empathy-appeal		x					x		x				x		
Sutton & Eiser (1984)	Employees of a company in London	Adults (M=32.8)	61	The effect of emotional ads on outcomes					x				x				x		

**Note:* EPPM: Extended Parallel Process Model, PMT: Protection Motivation Theory, CSM: Common Sense Model

continued Table 2.1 *Descriptive Table of Studies*

					Theory used								Emotion				Study type		
Author Year	**Population**	**Age**	**N**	**Study aim**	EPPM*	Psychological Reactance	PMT*	Gain-loss framed	Expectancy Value	CSM*	Mult. fear-appeal theories	None	Fear	Anger	Sadness	Disgust	Experimental	Cohort	Cross-sectional
Sutton & Hallett (1989)	Employees who smoked from companies in England	M=36.1	509	Fear & cognition on outcomes						x			x				x		
Timmers & van der Wijst (2007)	Dutch youth and adults	Group 1: 12-18 (M=14.9) Group 2: 25+ (M=44.8)	268	Emotions on outcomes	x								x		x		x		
Wong et al. (2013)	Nonsmoker students at a large Southwestern university	18-24	183	The effect of gain- and loss- framed messages				x					x	x			x		

**Note: EPPM: Extended Parallel Process Model, PMT: Protection Motivation Theory, CSM: Common Sense Model*

Table 2.2 *Study Outcomes by Emotion*

		Outcomes									
Emotions	**Study Author and year**	Intentions to quit	Intentions to talk to friends about quitting	Intention to NOT try a cigarette	Discouragement from smoking	Quit attempts	Changes in smoking behavior	Perceived effectiveness	Optimistic bias (post-test)	Attitudes toward clean indoor air policies
Fear	Byrne et al. 2015	+						+		
	Cameron et al. 2015				+					
	Hammond et al. 2004						+	+		
	Jonsdottir et al. 2014							+		
	Kang & Lin 2015 (pre-test)	+*							+	
	Kang & Lin 2015 (post-test)	-							-	
	Kees et al. 2010	+								
	Popova 2014							-		
	Shen 2011							+		
	Sutton & Eiser 1984	+								
	Sutton & Hallett 1989	+				-				
	Timmer & van der Wijst 2007			+						
	Wong et al. 2013		+							
Anger										
	Wong et al. 2013		-							
	Quick 2009									+
Disgust										
	Hammond 2004						+	+		
	Jonsdottir et al. 2014							+		
Sadness										
	Timmer & van der Wijst 2007	+								

NOTE: The +/- denotes the association of the emotional effect on the outcome

**in Kang & Lin 2015, pre-exposure fear was associated with pre-exposure intentions to quit*

Appendix A
Description of assessment of elicited emotion by study

Study	Emotion	Assessment of emotion
Byrne et al. (2015)	Fear	Perceived Fear was measured using 3-items rated on a 5-point Likert scales ranging from strongly disagree to strongly agree. **Perceived Fear** Participants rated how frightening, scary, and disturbing were the images they viewed. Responses were averaged into a single score (alpha=.88).
Cameron et al. (2015)	Fear	Fear-related reactions were measured using 2 items rated on a 7-point Likert scale (1=not at all to 7=extremely) adapted from a measure developed by Brown and Smith. **Fear-related reactions** Participants were asked, *'How much does this image make you feel worried?'* and *'How much does this image make you feel scared?*'. The two ratings were averaged to generate scores (mean r=0.94 across the 36 labels).
Hammond et al. (2004)	Fear Disgust	Ad-evoked fear and disgust was rated on a 5-point Likert scale (ranging from "not at all" to "extreme). **Ad-evoked fear** Participants asked to what extent they had felt fear as a result of the labels. **Ad-evoked disgust** Participants asked to what extent they had felt disgust as a result of the labels.

Study	Emotion	Assessment of emotion
Jonsdottir et al. (2014)	Fear Disgust	Ad-evoked fear and disgust was measured using 5 items on a 5-point Likert scale. **Ad-evoked Fear** A composite score for fear was based on ratings of "scary" and "frightening". (α =.94) **Ad-evoked Disgust** A composite score for disgust was based on ratings of "sickening", "gross", and "repulsive". (α =.94)
Kang & Lin (2015)	Fear	Ad-evoked fear was measured using 6-items on a 7-point Likert scale adopted from Rippetoe and Rogers (1987). **Ad-evoked Fear** Participants rated how frightened, tense, nervous, anxious, uncomfortable, and nauseous they felt after viewing the ad. These items were summed to become a single index for fear. (α =.95)
Kees	Fear	Ad-evoked fear was measured using 3-items on a 7-point Likert scale **Ad-evoked Fear** Participants were asked to indicate how fearful, anxious, and nervous the cigarette package made them feel. (alpha=.98)

Study	Emotion	Assessment of emotion
Popova (2014)	Fear	Fear was assessed in 2 ways using a 9-point Likert scale: **Overall Fear** Overall fear was measured pre- and post- ad exposure by asking participants to rate how scared of the health consequences of smokeless tobacco. **Ad-evoked Fear** Participants were then asked to rate how much fear and how afraid they felt when looking at the ad.
Quick et al. (2009)	Anger	Anger was measured using 3 items on a 7-point Likert scale. **Anger** Participants were asked to rate how angry, irritated, and annoyed they felt when they are around cigarette smoke from another person. (α =.86)
Shen (2011)	Fear	Ad-evoked fear was measured using 3 items on a 5-point Likert scale (0 = none of this feeling and 4 = a great deal of this feeling). **Ad-evoked Fear** Participants rated how fearful, afraid, and scared after viewing each ad. The items averaged into a single score. (α =.95)
Sutton & Eiser (1984)	Fear	Ad-evoked fear was measured using 2-items rated on a 9-point scale. **Ad-evoked fear** Participants rated how frightened and tense they felt when watching the film.

Study	Emotion	Assessment of emotion
Sutton & Hallett (1989)	Fear	Ad-evoked fear was measured using 7-items on a 9-point Likert scale **Ad-evoked fear** Participants rated how frightened, tense, worried, nervous, scared, afraid, and anxious they felt while watching the film.
Timmers & van der Wijst (2007)	Fear Sadness	Fear and sadness were rated on a 7-point scale. **Fear** Participants rated their fear for each ad. **Sadness** Participants rated their sadness for each ad.
Wong et al. (2013)	Fear Anger Guilt	Fear and anger were assessed pre- and post- gain- and loss- framed stimuli using 4-items each on a 5-point Likert scale. **Fear** Participants' level of fear arising from secondhand smoke exposure was measured by asking participants to what degree do they feel afraid (scared, worried, anxious) about secondhand exposure. Items were averaged into an index (α =.95). **Anger** Participants' level of anger towards friends who smoke was measured by asking participants to what degree they feel angry (irritated, annoyed, aggravated) at friends who smoke around them for exposing them to secondhand smoke. Items were averaged into an index (α =.98).

Appendix B
Description of stimuli by study

Author & Year	Emotion	Ad type	Description of ad	Exposure method	Conditions	Pre-test stimuli	Manipulation check
Byrne et al. (2015)	Fear	Warning label	Forty different types of warning labels were tested. The labels were groups into 5 themes: the proposed FDA graphic warning labels in full-color (These labels feature graphic images such as diseased lungs, warning text statements, cover 50% of the cigarette package size, and appear in full color.); the proposed FDA graphic warning labels in black-and-white, text-only labels; labels with the surgeon general's warning statements; and images of the fronts of existing cigarette packages; the way packs currently appear in the marketplace (no warning).	Each participant viewed 9 labels except for those in the warning text condition who saw 4 labels.	There were 5 conditions: (1) Full-color graphic warning labels; (2) Black-and-white graphic warning labels; (3) Warning text (no graphic image); (4) Surgeon General's warning; (5) No warning.	No	No
Cameron et al. (2015)	Fear	Warning label	Thirty-six proposed warning labels, including the nine labels ultimately selected by the FDA, and text-only labels that were presented with the warning statements in white and red text against a black background. Each label appeared on the face of an image of a cigarette pack and comprised top 50% of the front panel; the word 'Brand' appeared below the label.	Each participant viewed 18 of the 36 labels.	There were 2 non-specific groups--Version A and Version B. Labels were different for each group.	No	No

Hammond et al. (2004)	Fear	Warning label	Sixteen full-color Canadian health-warning labels, which are sometimes graphic, that covers more than 50% of the front and back of cigarette packages.	Nine months after the Canadian health warnings were introduced, participants were asked via phone survey, to retrospectively assess the impact of the warning labels on daily cigarette consumption, how often they thought about the health risks of smoking, confidence in their ability to quit, and the likelihood they would quit smoking.	NA	NA	NA
Jonsdottir et al. (2014)	Fear Disgust	TV ads	Six advertisements were selected from the CDC's Media Campaign Resource Center: "Terrie's Tip", "Suzy's Tip", "Artery", "Brain", "Echo", and "Still Can't Quit". All advertisements were approximately 30 seconds in duration and of high production quality. The advertisement "Artery" shows a physician removing fatty deposits from the aorta of a 32-year-old deceased smoker.	All participants viewed all 6 ads.	None	No	No

			The advertisement "Brain" shows a brain being cut in half to show a blood clot formed by smoking. The advertisement "Echo" shows several people discussing why they cannot quit smoking; each person gives an excuse, and between each excuse, a person either sick or dying from tobacco use provides an ironic analogy to the excuse. The advertisement "Still Can't Quit" shows a teenaged boy in a hospital room explaining that he has spots on his lung but he still cannot quit smoking. The advertisements "Suzy's Tip" shows Suzy talking about losing her independence after smoking caused her to have a stroke while her son gives her a sponge bath. "Terrie's Tip" shows Terrie getting ready for the day after the effects of treatments of throat cancer caused her to lose her teeth and hair and to have a tracheotomy.				
Kang & Lin (2015)	Fear	Print ad	Four antismoking print ads: Loss-framed message ("If you keep smoking, you can increase your risk of lung cancer mortality by 70%, compared to people who quit smoking" with a visual fear-	All study procedures occurred online. Participants took a baseline survey and	Four conditions: Loss-framed message with and without a visual fear-appeal and gain-framed	Yes	No

			appeal (disfigured lung) and without a visual fear-appeal (healthy lung) and gain-framed message ("If you quit smoking, you can reduce your risk of lung cancer mortality by 70%, compared to people who keep smoking" with and without a visual fear-appeal anti-smoking advertisement. Gain- and loss- framed messages and the 2 visual images went through a pre-test by a separate sample of 27 Korean male smokers. Researchers developed the stimuli in this study.	then were invited to engage in the experimental study two and a half weeks later. Each participant viewed a web-magazine that had 6 topics (health, personal finance, wine, jazz, travel, and food) and the anti-smoking ads (corresponding to their condition) that were inserted three times. After viewing the web-magazine, participants completed a post-survey.	message with and without a visual fear-appeal anti-smoking ad.		
Kees et al. (2010)	Fear	Warning label	Four color mock cigarette packages (highly graphic, moderate graphic, less graphic, and no graphics) were adapted from images and verbal warnings from warnings on cigarette packages from various countries taken from the internet. Three pictures (less, moderately, and highly graphic) varied in the graphic level of the depiction of the health consequence evoked by the picture.	Participants saw one of four warnings.	Four conditions: highly graphic, moderate graphic, less graphic, and no graphics (control).	Yes	Yes The manipulation checked the pictures used in the package stimuli measured participants' perceptions of the level of the graphic depiction of the warning

			Warning information is on the front panel of the cigarette package covering approximately 40% of the package. All labels included the single verbal warning "WARNING: Smoking Causes Mouth Diseases." The Camel brand of cigarettes was placed on each label. Pre-tests were done of 9 pictures and 3 verbal warnings that were available online and were taken from warnings on cigarette packages from various countries around the world (e.g., Australia, EU). The goal was to narrow down the pictures to a set of three that varied in graphic depiction (highly graphic, mod, less) and to ensure that the verbal message was consistent with each picture.				information. This check consisted of four seven-point scale items (endpoints of "not graphic at all/very graphic," "not vivid at all/extremely vivid," "very weak/very powerful," and "not intense at all/very intense"; a = .95).
Popova (2014)	Fear	Print ads	Eight print ads: 6 were anti-smokeless ads and 2 were control ads. Five of the anti-smokeless ads featured information about the negative health effects and one was a personal humorous testimony. Information about the control ads was not described. Anti-smokeless ads underwent a pre-test prior to the main study. Researchers developed the stimuli in this study	Participants were screened for smoking status (smoked at least 100 cigarettes in their lifetime), took a pre-test, randomized to one of eight groups, viewed ad #1, completed a brief questionnaire on ad #1, viewed ad #2, completed a brief questionnaire on ad	Eight conditions: 6 anti-smokeless groups, a control/smokeless group, and a control/control group.	Yes .	NA

				#2, and then completed a post-test.			
Shen (2011)	Fear	PSAs	Twelve anti-smoking public service announcements that had the potential to activate state empathy (n=4), fear (n=4), and neither empathy nor fear (n=4). Advertisements picked by three researchers, who were unaware of the study hypotheses, rated a collection of potential PSAs. Ratings of potential to activate state empathy were based on: (a) the degree a message portrayed some characters' pain, suffering, and distress; (b) perceived verisimilitude of the message; and (c) the degree a message is affect laden. Ratings of potential to arouse fear was based on: (a) perceived severity of dangers associated with tobacco smoking and (b) degree to which a message is graphic. Top four PSAs in each category was selected and the four that were judged neither empathy- nor fear-arousing were selected as control messages.	The study was conducted on computers in the researcher's lab. Participants viewed the first PSA (corresponding to their condition) and then completed a survey that included reporting their emotional response and listing whatever thoughts came to mind. This procedure was repeated for the other three PSAs. The entire procedure took approximately 30 minutes.	Three conditions: state empathy, fear, and control.	Yes	Yes To check the empathy and fear induction, two two-level models were estimated via the restricted maximum likelihood (REML) procedure to predict state empathy and fear respectively, using experimental condition as a fixed-effects factor, and age, sex, and message sensation value as covariates.
Sutton & Eiser (1984)	Fear	Video ad	Three videotape documentaries that lasted 25 minutes each: (1) "Dying for a fag?" a smoking documentary film with an extended interview of a middle-	Study procedures took place in a large office in London. All participants were	There were 6 groups varying in size from 20 to 30 participants. Each group saw either a	No	No

			aged man dying from lung cancer undercut with footage from a physician discussing the risks of smoking on health, (2) a control video on alcohol, and (3) another control video on seatbelts.	told they were taking a study on health. All participants completed a pre-test, and then 1 week later watched a documentary video either on smoking, alcohol, or on seatbelts, and then completed a post-test immediately after watching the video. Smokers were sent a follow-up questionnaire at the 3-month follow-up.	video on smoking, or a control video (a video on alcohol or seatbelts).		
Sutton & Hallett (1989)	Fear	Video ad	Six anti-smoking videos (25 minutes each): (1) 'Dying for a fag?' Was first broadcast in Britain in 1975. a smoking documentary film with an extended interview of a middle-aged man dying from lung cancer undercut with footage from a physician discussing the risks of smoking on health.; (2) Same video as above plus a 5 minute sequence designed to boost confidence added to the end; (3) Same as #1 minus a sequence of bins full of cancerous lungs were edited out; (4) A video called 'Smokers' Luck' features a man who continues to smoke in spit of	Two months after participants completed a baseline survey, they watched 1 of the 6 anti-smoking videos in small groups. After watching the video participants completed a post-survey.	Six conditions—4 experimental and 2 control conditions.	No	No

			having both legs amputated because of a smoking-related disease; and (5) and (6) two control videos 'License to Kill' and 'Tobacco War'. Neither control videos emphasized the consequences of smoking or obtained any material that could be fear- arousing.				
Timmers & van der Wijst (2007)	Fear Sadness	Warning label	Four health warning messages from Canada's anti-smoking campaigns: 1) risk of getting lung cancer; 2) risk of harming other people; 3) risk of potent; 4) risk of mouth disease.	All participants viewed all ads. Surveys were completed pre- and post- ad exposure.	None	No	No
Wong et al. (2013)	Fear Anger	PSA	Ten PSAs: 3 on secondhand smoke with a gain-framed message appeal, 3 on secondhand smoke with a loss-framed message-appeal, 2 on addiction with again-framed message appeal, and 2 on addiction with a loss-framed message-appeal. Basic statistics about tobacco use (no anti-smoking PSA) was used as a control. The gain-framed message emphasized the benefits of helping smokers quit whereas the loss-framed message highlighted the costs of not helping smokers quit. PSAs on secondhand smoke show	Study procedures were conducted online. Participants completed a pre-test, were then randomly assigned to a condition and viewed the corresponding PSA, and then completed a post-test. Those in the secondhand smoke condition watched 3 PSAs, those in the addiction condition watched 2 PSAs.	Five message conditions: gain-framed secondhand smoke PSAs, loss-framed secondhand smoke PSAs, gain-framed smoking addiction PSAs, loss-framed smoking addiction PSAs, and a control condition.	No	Yes

			an individual at a party, restaurant, or at a bar exposed to secondhand smoke. PSAs on addiction show smokers who are having great difficulty quitting smoking despite suffering from a smoking-related disease. PSAs were picked among numerous PSAs found online that were originally aired nationally and internationally on TV. One criterion for the PSAs was that it would be relevant to college students.				

Chapter 3

Paper 2: An experimental study examining the effect of four discrete emotions on smoking-related judgments.

An experimental study examining the effect of four discrete emotions on smoking-related judgments.

Abstract

The tobacco industry has criticized the U.S. FDA on their use of emotions in their proposed graphic health warnings for cigarettes. The industry stated that emotions were used just to evoke negative emotions and to force people to quit, rather than convey information ("R.J. Reynolds Tobacco Co., et al., v. Food & Drug Administration, et al.," 2012). However, no longer are emotions thought of as chaotic attributes. On the contrary, emotions are salient in processing information. The Appraisal-Tendency Framework (ATF) seeks to explain the differential effects emotions have on decision-making and judgments. The ATF has been used to explain outcomes related to risks such as terrorism and driving. However, studies on emotions and their effect on health behaviors, such as smoking, are scarce. Furthermore, no previous study has investigated the effect of discrete emotions on smoking-related perceptions (see Chapter 2).

The purpose of this study was to examine the effect of four discrete emotions (fear, anger, disgust, and sadness) on smoking-related perceptions. This was accomplished using an experimental design where emotions were elicited through the use of film clips. Among a sample of smokers and nonsmokers throughout the U.S., anger and sadness increased smoking-related perceptions of health risk and perceptions of responsibility. Perceptions of health risk of smoking play a very important role in smoking initiation. Perceptions of responsibility is important in public health because when people attribute some blame for health problems beyond the individual and to society and environmental factors, they are more likely to support change in public policies and institutional practices, which are important factors in addressing health problems.

Findings from this study demonstrate emotions are helpful in processing information, and that in turn, informs judgments and decision-making. Furthermore, understanding the effect emotions have in perceptions is helpful in tobacco control efforts in developing effective anti-tobacco campaigns to decrease smoking and increase advocacy for smoking policies.

Examining the literature of the effect of emotions on smoking-related outcomes revealed that ATF has not been fully utilized in a smoking context. Research has shown emotions influence health risk perceptions (Ferrer et al., 2016; Slovic, Peters, Finucane, & Macgregor, 2005), however there is no previous study that has investigated the effect of discrete emotions on smoking-related perceptions (see Chapter 2). The purpose of this study was to examine the effect of four discrete emotions (fear, anger, disgust, and sadness) on smoking-related perceptions of risks and responsibility. This was accomplished using an experimental design where emotions were elicited through the use of film clips. Fear, anger, sadness, and disgust were chosen because they are four common emotions elicited when viewing graphic health warnings and based on the ATF it is plausible that these four discrete emotions are relevant to influence smoking-related perceptions. I hypothesized that fear and disgust will increase risk perceptions, and anger and sadness will increase perceptions of responsibility. Understanding how emotions influence smoking-related perceptions is helpful for health communication and public health researchers in developing effective health warnings to decrease smoking.

Development of a film set that strongly elicits 4 target emotions.

The use of film clips was chosen for its ability to elicit emotions strongly. Compared to other methods used to elicit emotion (i.e. looking at a picture), film clips elicit emotions through audio and visual stimuli and provide a context for creating an emotional experience. There are studies that have developed film sets that strongly elicit a range of emotions from happiness to sadness (Gross & Levenson, 1995; Philippot, 1993). The issue is that some of the most cited film sets are decades old. What can make a film affective is its relevancy to the audience and that can involve cultural norms such as style of clothing to slang words used. Therefore a film set used for the purpose of this study was developed to ensure elicitation of four target emotions.

Methods

Participants were exposed to different film clips lasting less than five minutes long. A total of twelve film clips, two for each target emotion (fear, anger, sadness, disgust), two meant to elicit a low emotional state (neutral), and two meant to elicit positive emotions were also tested. The film clip with the highest rating for each of the target emotions were added to the film set.

Films

The film clips reflect a broad range of film styles, including animated films, black and white films, and independent films. Scenes have been cut from movies that were critically acclaimed, revered as a ‘classic’, as well as those that have received negative reviews. Some movies were picked due to their success in eliciting the target emotion in other studies (Bartolini, 2011; Gabert-Quillen, Bartolini, Abravanel, & Sanislow, 2015; Schaefer, Nils, Sanchez, & Philippot, 2010). Other more recent movie scenes were suggestions by colleagues. (See Appendix A for description of the films.)

A film meant to elicit low arousal was used as a control. The purpose of the positive emotion clip was to ensure participants not leave the study with any residual negative affect. For each session the positive film clip was viewed last.

Film clip sessions

For each film clip session, participants in groups of up to seven viewed six short film clips that include one clip for each one of our target emotions (anger, fear, sadness, and disgust), a neutral clip, and a clip meant to elicit positive emotion (shown last in each session). To counterbalance each emotion and avoid any emotional spillover effects from watching multiple videos the order of when the movies were shown were changed for each session. (See Appendix B for an example of the video sessions.)

Participants

Participants (N=63) were college students at UC Merced. They were recruited through UC Merced's SONA systems, an online research management program. SONA allows researchers at UC Merced to connect with its student population to partake in research in return for course credit. The sample was mainly female (78%) and 19.7 (SD = 1.4) years of age. Most were in their second year in college (34.9%) and majored in psychology (42.9%). Racial and ethnic make-up included 52.4% Hispanic, 28.6% Asian, 11.1% Black, 6.3% non-Hispanic White, and 1.6% identified as other. About 92.1% were non-smokers, 4.8% were former smokers, and 3.2% were current smokers. Of those who were current smokers smoked on average 2 cigarettes a day.

Study Procedures

Procedures took place in the research lab and on study computers. After participants provided consent to participate in the study, a study researcher started the film session. Participants were instructed to watch each film clip and to answer study questions on the study computers. Affect was measured prior to watching the first film and after each film. Questions about the film clips, smoking history, and sociodemographics were also collected. All study procedures were approved by the UC Merced IRB.

Study Measures

PANAS-X. The 60-item Positive and Negative Affect Scale- Extended version (PANAS-X) (Watson & Clark, 1999) was used to measure how participants felt at the start of the study and after watching each film clip. The scale consists of words and phrases describing different feelings and emotions that are rated on a 5-point scale (1 = very slightly/not at all, 5 = extremely). Emotions listed range from negative (i.e. afraid, upset) to positive (i.e. joyful, happy). The PANAS-X also measures specific affects including fear (averages *afraid, scared, frightened, nervous, jittery,* and *shaky* scores) and sadness (averages *sad, blue, downhearted, alone,* and *lonely* scores). This assessment measures mood at two different levels and has been validated and found to be reliable.

Movie Questions. Participants were asked if they had seen the film before and if they closed their eyes or looked away during the scene.

Smoking History. Smoking status (*current*, *former*, or *non-smoker*) was assessed. Current smokers were those who reported smoking at least 100 cigarettes in their lifetime and 30 cigarettes in the last 30 days, former smokers smoked at least 100 cigarettes in their lifetime but did not smoke any in the last 30 days, and non-smokers were those who had not smoked 100 cigarettes in their lifetime. If they identified as a current smoker the amount of cigarettes smoked on a typical day was also assessed.

Sociodemographics. Gender, age, education level, and race and ethnicity were assessed.

Analyses

For each film, the intensity (mean scores) of each emotion from the PANAS-X was measured, with the top five emotions highlighted. The fear and sadness subscales were also calculated. ANOVAs were conducted to test whether there were mean differences of the target emotion between the film clips of the same target emotion category.

Results

Participant's top emotions prior to watching the film clips were calm (M=3.65, SD= 0.93), relaxed (M = 3.49, SD = 1.24), attentive (M = 3.41, SD = 0.96), tired (M = 3.29, SD = 1.33), sleepy (M = 3.10, SD = 1.41), and at ease (M = 3.10, SD = 1.20).

Emotions by movie

Fear. Movie clips from *Lights Out* and *Psycho* were analyzed to determine which clip elicited the most fear. The five highest emotions rated for *Lights Out* were afraid (M = 3.46, SD = 1.34), attentive (M = 3.41, SD = 1.28), alert (M = 3.31, SD = 1.13), scared (M = 3.15, SD = 1.31), and nervous (M = 3.09, SD = 1.46). *Psycho's* five highest rated emotions were attentive (M = 2.85, SD = 1.23), alert (M = 2.69, SD = 1.09), concentrated (M = 2.31, SD = 1.44), disgusted (M = 2.11, SD=1.01), and surprised (M = 2.04, SD = 1.22). See Figure 1. Out of all the films tested *Lights Out* produced the highest intensity score for afraid and scared (see Appendix C). Analyzing fear using the fear subscale, *Lights Out* had the highest rating (M = 2.99, SD = 1.11) and produced significantly more fear than *Psycho* (M = 1.61, SD = .66), F (1, 58) = 31.56, p = .000.

Anger. Movie clips from *Crash* and *Fruitvale* were analyzed to determine which clip elicited the most anger. The five highest emotions rated for *Crash* were disgusted (M = 4.04, SD = 1.14), attentive (M = 3.54, SD = 1.04), angry (M = 3.29, SD = 1.41), upset (M = 3.29, SD = 1.44), and alert (M = 2.93, SD = 1.27). *Fruitvale's* five highest rated emotions were disgusted (M = 3.97, SD = 1.15), attentive (M = 3.97, SD = 1.04), upset (M = 3.83, SD = 1.25), angry (M = 3.66, SD = 1.43), and sad (M = 3.40, SD = 1.22). *Fruitvale* produced the highest intensity score for angry (M = 3.66, SD = 1.43). However, angry scores did not significantly differ, F (1, 61) = 1.06, p = .307.

Sad. Movie clips from *Up* and *Shawshank Redemption* were analyzed to determine which clip elicited the most sadness. The five highest emotions rated for *Up* was sad (M = 3.61, SD = 1.20), attentive (M= 3.07, SD = 1.44), concentrating (M = 3.04, SD = 1.26), calm (M = 2.96, SD = 1.04), and interested (M = 2.93, SD = 1.15).

Shawshank Redemption's five highest rated emotions were sad (M = 3.37, SD = 1.17), attentive (M = 2.94, SD = 1.19), surprised (M = 2.83, SD = 1.42), upset (M = 2.46, SD = 1.31), and calm (M = 2.34, SD = 1.06). *Up* produced the highest intensity score for sad (M = 3.61, SD = 1.20). Analyzing sadness using the sadness subscale, *Up* had the highest rating (M = 2.21, SD = .79) but was not significantly sadder than *Shawshank Redemption*, F (1, 61) = 0.12, p = .728.

Disgust. Movie clips from *Pink Flamingo* and *Trainspotting* were analyzed to determine which clip elicited the most disgust. The five highest emotions rated for *Pink Flamingo* were disgusted (M = 4.64, SD = .87), surprised (M = 3.86, SD = 1.30), attentive (M = 2.93, SD = 1.27), alert (M = 2.52, SD = 1.42), and irritable (M = 2.39, SD = 1.23). *Trainspotting's* five highest rated emotions were disgusted (M = 4.23, SD = 1.03), surprised (M = 3.17, SD = 1.25), attentive (M = 2.83, SD = 1.25), alert (M = 2.34, SD = 1.06), and amazed (M = 2.37, SD = 1.22). *Pink Flamingo* produced the highest intensity score for disgust (M = 4.64, SD = 0.87), though differences were not significant, F (1, 61) = 2.88, p = .10.

See Table 3.1 for a summary of movie means by emotion.

Discussion

Overall, movies are an appropriate way to elicit emotions for research purposes. From all the movies tested, fear was rated highest in *Lights Out*, anger in *Fruitvale*, sadness in *Up*, and disgust in *Pink Flamingo*. These four movies will be used in the main study. Use of the PANAS-X allowed participants to rate up to 60 different emotions to the film clips they viewed, decreasing potential bias. Some studies that examine emotional reactions only ask participants to rate a few emotions (e.g. 10), which could possibly leave out emotions that would be elicited. It should be noted that there was an overlap in target emotions in both the movies for anger. In both *Crash* and *Fruitvale* there was a high level of disgust, as well as anger. Previous studies examining emotion elicitation through film have reported similar findings of an anger-disgust overlap (Bartolini, 2011; Gilman et al., 2017; Gross & Levenson, 1995; McHugo, Smith, & Lanzetta, 1982; Philippot, 1993). Based on other's discussion of the anger-disgust overlap, when it comes to elicited disgust it is possible that two types of disgust are at play (Bartolini, 2011; Gilman et al., 2017). It could be that use of the word disgust relates to a moral or social disgust, as was seen in the films meant to elicit anger that were morally upsetting. In the anger movies the anger-disgust overlap exists. On the other hand there could also be a physical or biological disgust as was seen in *Pink Flamingo* with the digestion of feces. In these disgust films, anger is not elicited. For the purpose of the main study, all movies are appropriate to use to elicit the four target emotions. While the movie meant to elicit anger can also elicit disgust, it is the self-rated emotions that will be tested and not the movies itself.

Main study: Emotions and smoking-related perceptions

Methods

Participants

Participants were mostly female (61.6%), non-Hispanic White (71.3%), employed (61.2%), had completed more than a high school education (79.9%), made less than $41,000 a year (64.4%), and resided in the southern part of the U.S. (35.4%). Mean age was 36.7 (SD = 13.2) years. Almost half of the sample self-reported as a never smoker (49.5%), 29.4% as a current smoker, and 21.1% as a former smokers. Current smokers smoked a mean of 12.5 (SD = 7.7) cigarettes on a typical day. See Table 3.2.

Recruitment

Participants were active subscribers to the website Mechanical Turk (MTurk). Inclusion criteria were being able to read English, being at least 18 years of age and a member of MTurk. MTurk is a public website open to all individuals from throughout the United States. As a result a national sample was expected. MTurk has become a popular tool for behavioral researchers for its ease in recruitment and payment. Incentives for Workers is collected on Amazon.com via gift certificate, or transferred to a Worker's U.S. bank account. Incentive structure commonly seen on MTurk has been as low as $0.01, with many companies offering $0.10. One study examined MTurk as a tool for various types of experimental behavioral research and found many participants were willing to take part in a 15–30 minute study even when offered $0.75 (Crump, McDonnell, & Gureckis, 2013). They were also able to recruit very quickly and run 40 participants within 2 hours time (Crump et al., 2013). By 2015, there were reportedly over 500,000 *Turkers*, and since then this number has grown substantially (Hitlin, 2016).

Recruitment occurred in two stages. In the first stage all members on MTurk who met inclusion criteria were able to participate in the study. The second stage focused on recruiting smokers. Members of MTurk were invited to complete a pre-screen survey. To mask the purpose of the screener members were asked a variety of questions on health behaviors such as physical activity, as well as smoking. Members who identified as being a current smoker, smoked at least 100 cigarettes in their lifetime, and smoked in the last 30 days were then invited to participate in the main study.

Study Procedures

Participants were randomized to either a control or one of four experimental groups (fear, anger, sadness, or disgust). Participants in the control group watched a short film clip meant to elicit no emotion (a neutral film clip) and participants in the experimental groups viewed a short film clip representing one of four target emotions: anger, fear, sadness and disgust. After the emotion manipulation, smoking-related perceptions of risk and responsibility were assessed. The UC Merced IRB approved all study procedures.

Due to the experimental design, participants were masked to the purpose of the study in order to decrease bias. Instead participants were told the study purpose is to examine emotions and health. At the last page of the study survey participants were debriefed on the real purpose of the study.

All study procedures occurred online on Qualtrics. MTurk members who met inclusion criteria (at least 18 years of age, read English) were able to view the link to the study on MTurk. Those who were identified as smokers from the pre-screener were give a 'qualification' code to be able to view and access the study link on MTurk.

Informed consent was obtained through an online procedure before the start of the study on Qualtrics. The online consent form enables the participant themselves to review the form, which indicates the study procedures, and to indicate whether they agree to participate in the study by clicking on the button at the bottom of the page. If participants click that they do not agree the participant will not continue to the study survey and will be debriefed and thanked for their time.

Participants who provided informed consent, confirmed they met inclusion criteria, and acknowledged receipt of information on one's rights in a research study, were then randomized into one of five conditions (control, fear, anger, sadness, or disgust condition). Depending on condition, participants watched a film that elicited fear, anger, sadness, disgust, or no specific emotion. Prior to watching the film clip they were instructed to be in a place where they could hear and see the movie without distractions. Immediately after watching the short movie clip participants' smoking-related perceptions of risk and responsibility were assessed. In addition, questions about the film clips, current affect, smoking history, and sociodemographics were collected. At the end of the study, participants watched a second film that was meant to elicit positive affect. The purpose of the second clip was to ensure that participants not leave the study with any residual negative affect. After completing the study participants received compensation in the amount of $0.25, which was deposited into their MTurk account. All study procedures were approved by the UC Merced IRB.

Study Measures

Measures of smoking-related perceptions. Smoking-related perceptions of health risk was assessed by asking participants to rate from 0 to 100 the likelihood that they would get a chronic illness due to smoking. Smoking-related perceptions of responsibility were assessed using an 8-point Likert scale (0 = Extremely unlikely, 7 = Extremely likely) and asking participants how likely is it that someone, tobacco companies, and public policies are responsible for people smoking.

PANAS-X. The 60-item Positive and Negative Affect Scale- Extended version (PANAS-X) (Watson & Clark, 1999) was used to measure how participants felt after watching a film clip. The scale consists of words and phrases describing different feelings and emotions that are rated on a 5-point scale (1 = very slightly/not at all, 5 = extremely). Emotions listed range from negative (i.e. afraid, upset) to positive (i.e. joyful, happy).

Movie Questions. Participants were asked if they had seen the film before and if they closed their eyes or looked away during the scene.

Smoking History. Current smoking status (*current*, *former*, or *non-smoker*) was assessed. If a participant identified as a current smoker the amount of cigarettes smoked on a typical day was assessed.

Sociodemographics. Gender, age, education level, race and ethnicity, geographic location, income level, and occupation were also assessed.

Analyses

Descriptive statistics (means, frequencies) were used to describe the sample. Analysis of variance (ANOVAs) was used to check that fear, anger, sadness, and disgust were appropriately induced. Multiple linear regressions were used to investigate the association of emotion and perception outcomes controlling for sociodemographics, smoking status, and condition. To test differences in intensity of target emotions, target emotion variables were split into tertiles and categorized by intensity (low, medium, high). Significant results were further tested with Bonferroni contrasts.

Results

For most participants (84.6%) it was their first time seeing the film clip. Only 11.7% reported closing their eyes sometime during the film clip.

Manipulation check

Across all conditions the mean for afraid was 2.04 (SD = 1.30), anger was 2.00 (SD = 1.45), sad was 2.25 (SD = 1.50), and disgust was 2.63 (SD = 1.72). ANOVAs indicated that the manipulation of emotions through the film clips significantly increased ratings for the target emotion. Those in the fear condition reported more fear (M = 3.00, SD = 1.33), $F(4, 509) = 32.18$, $p < .000$, anger was highest in the anger condition (M = 3.62, SD = 1.47), $F(4, 509) = 84.75$, $p < .000$, sadness was highest in the sad condition (M = 3.48, SD = 1.37), $F(4, 509) = 78.66$, $p < .000$, and disgust was highest in the disgust condition (M = 4.54, SD = 0.94), $F(4, 509) = 375.49$, $p < .000$. Calm was rated the highest in the control condition (M = 2.50, SD = 0.61), $F(4, 208) = 34.55$, $p < .000$.

Emotions on smoking-related perceptions

In multivariate regression analyses, controlling for sex, race, region of the U.S. resided, smoking status, and condition, fear, anger, and sadness were significantly associated with perceptions of health risk and perceptions of responsibility. Fear was also associated with perceptions of health risk and perceptions of responsibility of public policies and the tobacco companies, but not perceptions of responsibility. See Table 3.3. (See Appendix D for an expanded version of Table 3.3).

Anger ($F(2, 510) = 3.83$, $p = .02$) and sadness ($F(2, 510) = 5.49$, $p = .00$) both increased perceptions of health risk of smoking (see Table 3.3 and 3.4). Specifically, high anger compared to low anger (High M = 47.3 vs. Low M = 37.5, $p = .02$), and high sadness compared to low sadness (High M = 46.5 vs. Low M = 35.4, $p = .00$) significantly increased perceptions of health risk of smoking. High fear increased perceptions of health risk of smoking ($F(2, 510) = 2.89$, $p = .06$), but this trend was not significant. Anger significantly increased perceptions of responsibility of tobacco companies ($F(2, 510) = 3.41$, $p = .03$), as did sadness ($F(2, 510) = 6.16$, $p < .00$). Sadness also increased perceptions of responsibilities of public policies ($F(2, 510) = 2.96$, $p = .05$), though this effect was marginal. Intensity of disgust did not significantly impact perceptions of health risk or perceptions of responsibility. Only in multivariate analyses did disgust have an effect on perceptions of health risk. (See Appendix E for correlation table of emotion and perception outcome variables.)

Discussion

Among a sample of smokers and nonsmokers throughout the U.S., discrete emotions were found to impact smoking-related perceptions of health risk and responsibility. Anger and sadness increased perceptions of health risk of smoking and perceptions of responsibility, differences in fear intensity had a marginal impact on perceptions of risk of smoking, and differences in disgust intensity showed no impact on smoking-related perceptions.

Most GHWs rely on fear-appeals and have disgusting images that highly evoke fear and disgust to persuade people from smoking. Findings from this study show that other emotions besides fear and disgust may be helpful in influencing smoking outcomes, specifically smoking-related perceptions. This is important because it demonstrates the utility of anger and sadness to increase health risk perceptions, which in turn decreases smoking uptake.

Anger and sadness also significantly increased perceptions of responsibility of the tobacco company in getting people to smoke. This is inline with ATF as anger and sadness score high on other/situational responsibility on appraisal dimensions and have attributions to decrease trust and increase blame (Ferrer et al., 2016). Placing the responsibility on tobacco companies for people's smoking makes sense as consumers purchase products made by the tobacco companies. Though this may imply a diffusion of responsibility where individuals rely on the tobacco companies to deal with smoking issues and less responsibility on individuals or other institutions (i.e. public officials, public health departments). This in turn may inhibit people's advocacy efforts to combat tobacco company's practices (i.e. through policy changes at local and statewide levels); yet it may lead to empower people to stand up to the tobacco companies through the law (i.e. lawsuits, litigation). How exactly perceptions of responsibility matter in terms of smoking-related behaviors (i.e. advocacy to change policies) is not clear and future research is needed to uncover this relationship. Overall, incorporating anger-appeals and sadness-appeals in GHWs and health communications can be a way to keep anti-smoking messages novel and effective. Future studies should examine the impact of emotions on intentions to support and vote for smoking ban policies, as well as the indirect role of perceptions between emotions and policy support.

Implications of emotions in GHWs

Roll out of graphic health warnings by the United States Food and Drug Administration have been delayed in the U.S. since its mandate in 2009. This is due to several attempts by tobacco companies to challenge the mandate. In 2012 the tobacco industry successfully appealed the mandate based on the warnings' infringement on their First Amendment rights ("R.J. Reynolds Tobacco Co., et al., v. Food & Drug Administration, et al.," 2012). The FDA was criticized for "…unabashed attempts to evoke emotion (and perhaps embarrassment) and browbeat consumers into quitting" and that the "…graphic images were chosen not to convey information, but to evoke negative emotions and thereby discourage smoking" ("R.J. Reynolds Tobacco Co., et al., v. Food & Drug Administration, et al.," 2012). Contrary to these criticisms, emotions are what is helpful in processing information, and that in turn, informs judgments and decision-making. In addition, pictorial warning labels (including the 9 pictorial warnings proposed

by the FDA) have been shown to be no more informational than text-only labels, contradicting the courts' conclusions that pictorial messages do not convey information (Popova, Owusu, Jenson, & Neilands, 2017). Also, in that same study informativeness was highly correlated with emotion (Popova et al., 2017). The importance of emotion in GHWs and its influence on smoking-related outcomes (i.e. intentions to quit and quitting behavior) cannot be overlooked. As was shown in this study, discrete emotions and the intensity of the emotion are able to impact smoking-related perceptions; and as previous studies have shown, health risk perceptions are an important factor in deciding whether to smoke or not (A. V. Song, Morrell, et al., 2009). Therefore, in response to the court's decision it would be worthwhile to consider new GHWs that aim to change smoking-related perceptions, an antecedent to behavior.

Strengths and limitations

This is the first study to my knowledge that has focused on the influence of discrete emotions (versus valence emotions or mood states) on smoking-related perceptions of health risk and responsibility. Examination of perceptions of responsibility is an under-researched topic and this is one of the first studies to examine this topic in a smoking context. It contributes to the ATF literature and to the understanding of the relationship between 4 discrete emotions (fear, anger, sadness, and disgust) and health-related outcomes. As an experimental study, it also allows the casual direction to be clearer. However, this study may not be generalizable to all communities. Considering disparities in smoking prevalence, how emotions influence those of vulnerable populations (youth, unemployed, racial/ethnic groups) on smoking-related judgments and decision-making is worth examining in future research. Data in this study is limited by self-reported emotions based on exposure to film clips. Because of the nature of this online experimental study other environmental stimuli cannot be accounted for, as would be the case if participants were to view the film clips in a monitored and controlled environment. While distractions could have played a part in this study, there were checks throughout the online survey to ensure participants indeed watched the film clip to its entirety. Lastly, the lack of an effect of disgust in perceptions of responsibility was surprising and it is possible that disgust in this study encompassed a moral disgust and a physical disgust that may have different cognitive appraisals and thus motivate different action tendencies. Can moral disgust influence smoking-related outcomes? GHWs of blackened lungs and rotting teeth usually depict images that cause revulsion and possibly linked to a physical disgust. However, more research is needed to fully understand whether or not there are two types of disgust, and if so, how they would influence smoking-related outcomes.

Conclusion

Anger and sadness are helpful in increasing smoking-related perceptions of health risk and responsibility. While GHWs have relied on fear and disgust, implications from this study reveal that incorporating anger- and sadness-appeals may be useful in GHWs to change smoking-related perceptions. Use of anger and sadness can also keep messages novel and effective. Perceptions of health risk are important in decreasing smoking initiation and perceptions of responsibility may be helpful in advocating for tobacco policy changes. Though future studies are needed to fully understand how smoking-related perceptions of responsibility can affect smoking-related behavior, and to understand the impact of emotions on intentions to support and vote for smoking ban policies.

Table 3.1 *Movie Means by Emotion and Fear and Sadness Subscales (N=63)*

Emotion	Movie	n	Mean	SD	F	p
Anger					1.06	.31
	Crash	28	3.29	1.41		
	Fruitvale	35	3.66	1.43		
Fear						
	Psycho	26	1.81	1.10	26.40	.00
	Lights out	35	3.46	1.34		
Sad						
	Up	28	3.61	1.20	.62	.43
	Shawshank	35	3.37	1.17		
Disgust						
	Pink Flamingo	28	4.64	0.87	2.88	.01
	Trainspotting	35	4.23	1.03		
PANAS-X Fear subscale					31.56	.00
	Psycho	26	1.61	0.66		
	Lights out	34	2.99	1.11		
PANAS-X Sadness subscale					0.12	.73
	Up	28	2.21	0.79		
	Shawshank	35	2.15	0.70		

Table 3.2 *Sample Characteristics (N=513)*

	Full Sample	
Variable	n	%
Sex		
Male	192	37.8
Female	313	61.6
Other	3	0.6
Age, mean (SD)	512	36.7 (13.2)
Ethnicity		
Non-Hispanic White	360	71.3
Hispanic	47	9.3
Black	47	9.3
Asian	21	4.2
Other	30	5.9
Education		
≤HS	102	20.1
>HS	406	79.9
Employed	314	61.2
Income		
≤$40K	327	64.4
>$41K	181	35.6
Region		
West	127	25
South	180	35.4
Mid-West	114	22.4
North-East	87	17.1
Smoking Status		
Never	254	49.5
Current	151	29.4
Former	108	21.1

Table 3.3 *Regression Analyses of Emotion on Smoking-Related Perception Outcomes*

		Perception of Responsibility		
	Perception of health risk	Public policies	Someone	Tobacco companies
Emotion	B	B	B	B
Fear	3.74**	0.19**	0.06	0.17*
Anger	3.21**	0.22*	0.27**	0.28**
Sadness	3.63**	0.32***	0.25**	0.41***
Disgust	3.94*	0.05	0.08	0.18

Note: All models adjusted for sex, race/ethnicity, region, smoking status, and condition
B=Unstandardized coefficients
*p < .05, **p < .01, ***p < .001

Table 3.4 *Emotion Intensity on Smoking-Related Perceptions*

						Perception of Responsibility											
		Perception of health risk				Public policies				Someone				Tobacco companies			
Emotion	n	M	SD	F	p	M	SD	F	p	M	SD	F	p	M	SD	F	p
Fear				2.89	.06			1.51	.22			0.79	.45			2.82	.06
Low	266	37.0	32.0			4.5	2.3			4.7	2.2			4.8	2.1		
Medium	159	39.4	29.6			4.7	2.0			5.0	2.0			5.3	1.9		
High	88	46.3	31.6			4.9	2.3			4.9	2.3			5.2	2.3		
Partial η^2		.01				.01				.00				.01			
Anger				3.83	.02			1.16	.32			1.46	.23			3.41	.03
Low	311	37.5	31.2			4.5	2.3			4.6	2.0			4.9	2.2		
Medium	105	37.4	30.3			4.6	2.2			4.7	2.1			5.2	2.3		
High	97	47.3	33.3			5.0	2.1			4.8	2.0			5.5	2.1		
Partial η^2		.02				.01				.00				.01			
Sadness				5.49	.00			2.96	.05			1.79	.17			6.16	.00
Low	259	35.4	31.5			4.4	2.3			4.6	2.3			4.7	2.2		
Medium	122	40.0	28.5			4.8	1.9			5.1	1.8			5.2	1.8		
High	132	46.5	33.2			4.9	2.3			4.9	2.1			5.4	2.0		
Partial η^2		.02				.01				.01				.02			
Disgust				1.19	.31			2.27	.10			0.63	.53			0.93	.40
Low	235	37.0	31.1			4.8	2.2			4.8	2.2			5.1	2.1		
Medium	138	41.0	29.4			4.3	2.0			4.7	2.0			4.8	1.9		
High	140	41.7	34.3			4.8	2.3			5.0	2.2			5.0	2.2		
Partial η^2		.01				.01				.00				.00			

Appendix

Appendix A. Description of film clips

Anger

Crash: The scene starts with a male cop talking on the phone (which indicates racism). The cop later pulls over a black couple and sexually assaults the wife in front of her husband. Scene ends with the wife getting back in the car and closing the door.

Fruitvale Station: The scene starts with a cop ordering someone out of a BART train. He forcefully removes a young black man, has him join a group of young black people, and starts to verbally assault the youth. Verbal and physical assaults initiated by the cops follow, and the scene ends with one of youth getting shot and an uproar from the crowd.

Disgust

Pink Flamingos: The scene starts with fecal matter being expelled from a dog's rectum. The character Divine takes the feces and proceeds to pick up the fecal matter and eat it.

Trainspotting: A man visits the "the worst toilet in Scotland". His drugs accidently fall into this toilet. In order to retrieve his drugs he dives into the toilet.

Fear

Lights Out: Scene starts with a woman getting ready for bed and turning off the lights. When she does so she sees a shadowy figure. Unsure of what she saw she turns the lights back on and sees nothing resembling the shadowy figure. She hurries to bed obviously frightened. The scene ends with a figure next to her bed.

Psycho: The scene starts with a woman getting into the bathroom preparing for a shower. She steps into the shower, turns on the water, and while she bathes a figure appears in the bathroom. Someone attacks the woman with a knife, leaves, and the woman dies while trying to leave the shower. The scene ends on the woman's face, as she lies half out of the shower.

Positive affect

The Proposal: The scene starts with a woman in the woods, examining an area. She comes across another woman chanting, and the chanting woman invites the other to dance. After reluctantly agreeing, the woman dances and chants with the chanting woman, and ends up singing and dancing to "Get Low" by Lil John and The East Side Boys. A man walks in on this dance, and the woman is embarrassed. The scene ends with the woman and man walking into the woods.

We're the Millers: The scene starts with a father turning on the radio. The kids like the song that is playing, and start to sing along. The son surprises the family with a rap, and the scene ends with the family driving away.

Sadness

The Shawshank Redemption: An old man is finally released from prison and a voice over narrates as we see this man head home on the bus. The scene ends with the man committing suicide and a scene of his legs hanging in the air.

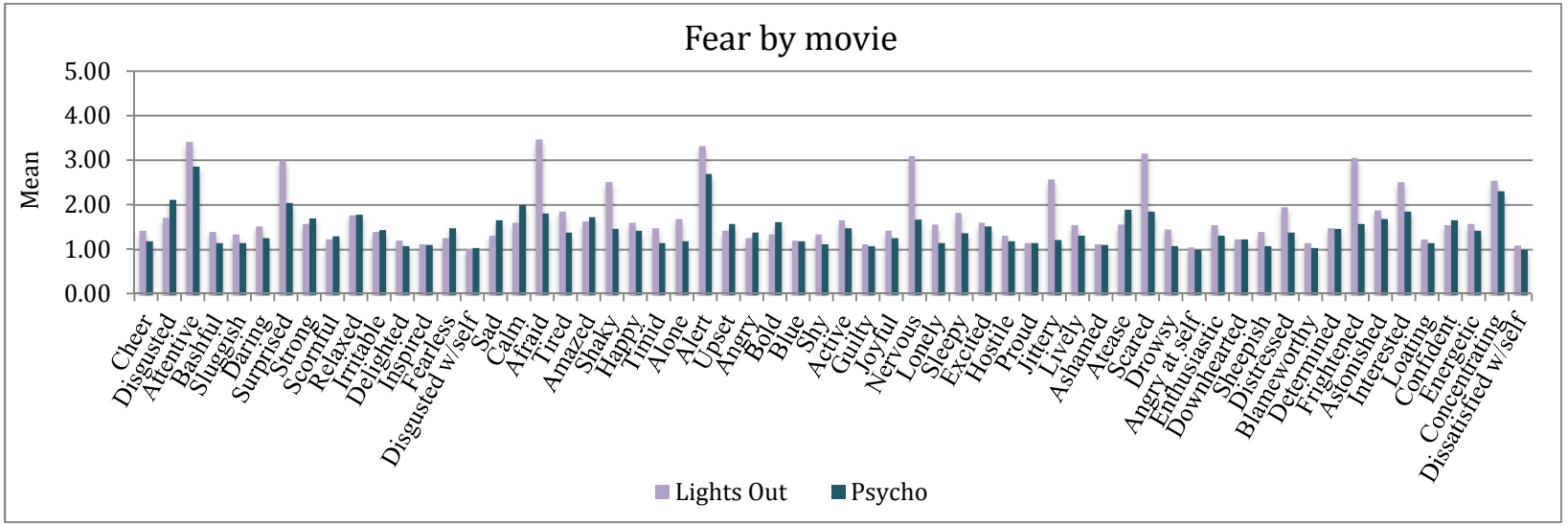
Up: A cartoon movie that starts with a man and a woman falling in love. Snippets of their life throughout the years are showed, along with plans for a trip to a waterfall that the couple never seems to get to make. The scene ends with the wife's death.

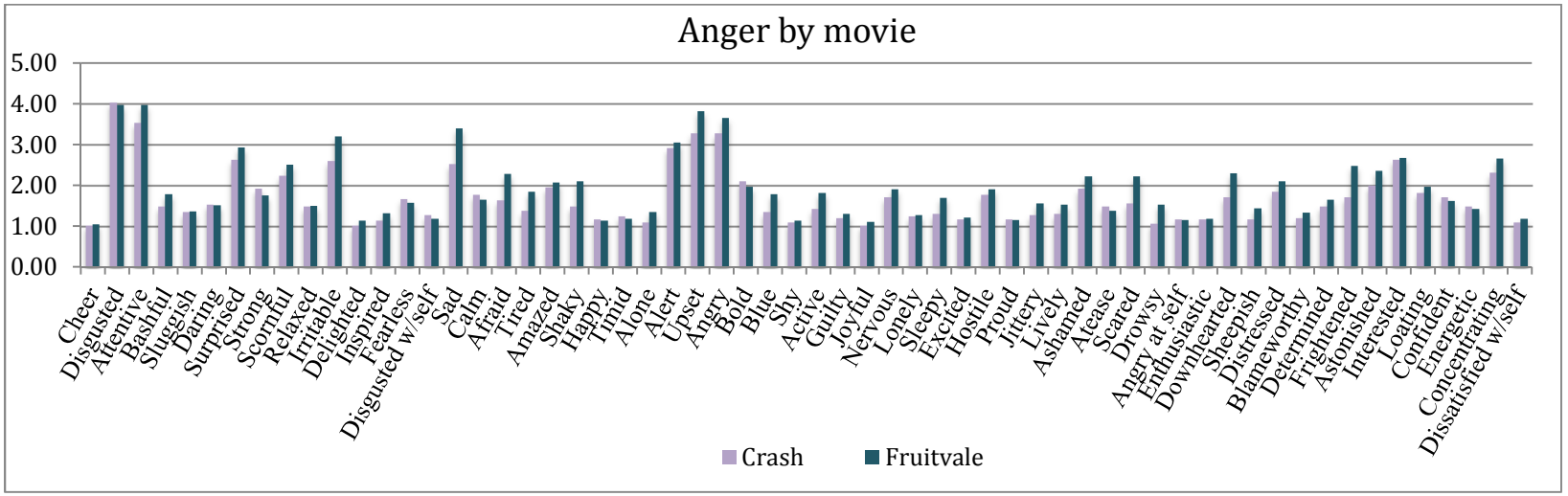
Appendix B. Example of video sessions

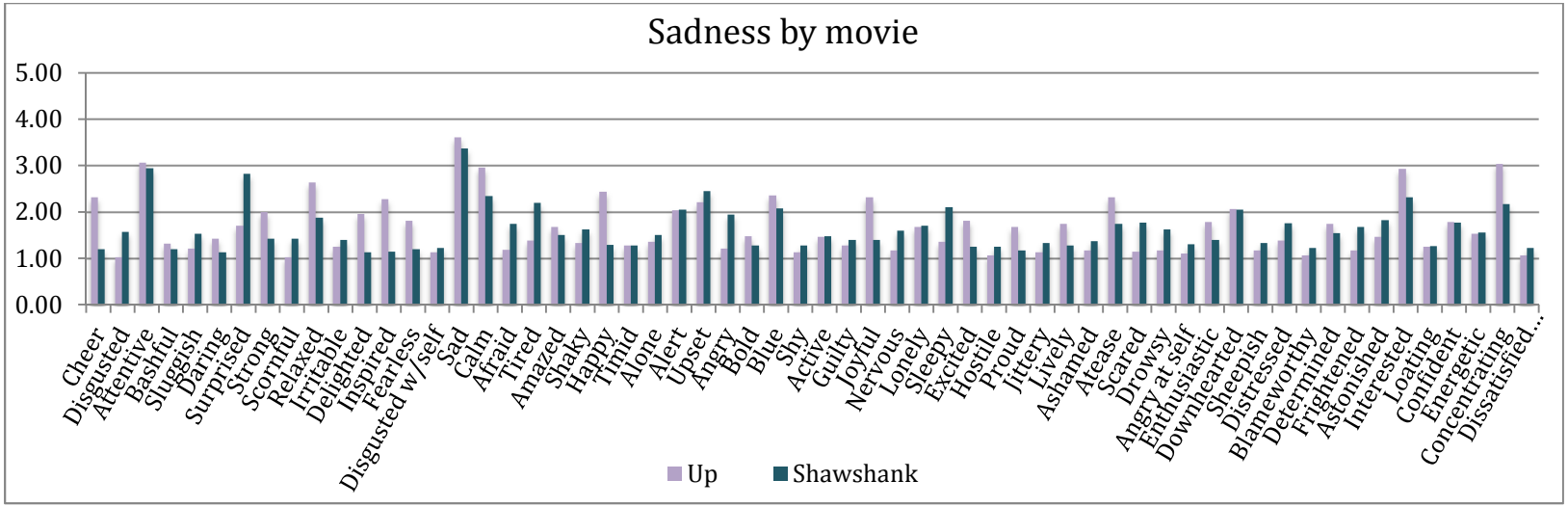
First set of video series					
Session 1	Session 2	Session 3	Session 4	Session 5	
A1	B1	C1	D1	E1	
B1	C1	D1	E1	D1	
C1	D1	E1	C1	A1	
D1	E1	B1	A1	B1	
E1	A1	A1	B1	C1	
F1	F1	F1	F1	F1	
Second set of video series					
Session 6	Session 7	Session 8	Session 9	Session 10	
A2	B2	C2	D2	E2	
B2	C2	D2	E2	D2	
C2	D2	E2	C2	A2	
D2	E2	B2	A2	B2	
E2	A2	A2	B2	C2	
F2	F2	F2	F2	F2	

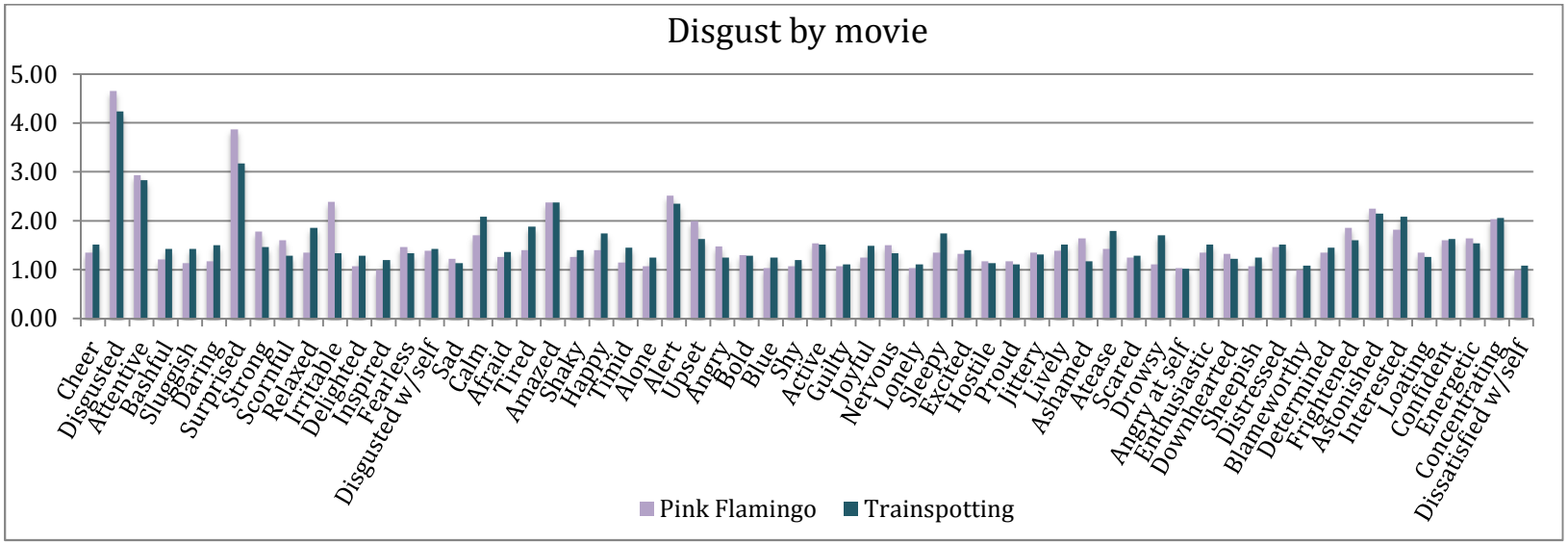
Note: A1 = fear 1 video; A2 = fear 2 video. B1 = anger 1 video; B2 = anger 2 video, etc.

Appendix C. Emotion means by movie






Sadness by movie
5.00
4.00
3.00
2.00
1.00
0.00
Cheer
Disgusted
Attentive
Bashful
Sluggish
Daring
Surprised
Strong
Scornful
Relaxed
Irritable
Delighted
Inspired
Fearless
Disgusted w/self
Sad
Calm
Afraid
Tired
Amazed
Shaky
Happy
Timid
Alone
Alert
Upset
Angry
Bold
Blue
Shy
Active
Guilty
Joyful
Nervous
Lonely
Sleepy
Excited
Hostile
Proud
Jittery
Lively
Ashamed
Atease
Scared
Drowsy
Angry at self
Enthusiastic
Downhearted
Sheepish
Distressed
Blameworthy
Determined
Frightened
Astonished
Interested
Loating
Confident
Energetic
Concentrating
Dissatisfied...
Up
Shawshank


Disgust by movie
5.00
4.00
3.00
2.00
1.00
0.00
Cheer
Disgusted
Attentive
Bashful
Sluggish
Daring
Surprised
Strong
Scornful
Relaxed
Irritable
Delighted
Inspired
Fearless
Disgusted w/self
Sad
Calm
Afraid
Tired
Amazed
Shaky
Happy
Timid
Alone
Alert
Upset
Angry
Bold
Blue
Shy
Active
Guilty
Joyful
Nervous
Lonely
Sleepy
Excited
Hostile
Proud
Jittery
Lively
Ashamed
Atease
Scared
Drowsy
Angry at self
Enthusiastic
Downhearted
Sheepish
Distressed
Blameworthy
Determined
Frightened
Astonished
Interested
Loating
Confident
Energetic
Concentrating
Dissatisfied w/self
Pink Flamingo
Trainspotting

Appendix D. Expanded Table 3.3 of regression analyses of emotion on smoking-related perception outcomes

Regression analyses of fear, sociodemographics, smoking status and experimental condition on smoking-related perceptions

			Perception of Responsibility					
	Perception of health risk		Public policies		Someone		Tobacco companies	
Emotion	B	95% CI	B	95% CI	B	95% CI	B	95% CI
Fear	3.74	1.45, 6.03	0.19	0.03, 0.36	0.06	-0.11, 0.22	0.17	0.01, 0.32
Female	4.60	-0.99, 10.19	0.44	0.05, 0.84	-0.26	-0.67, 0.15	0.04	-0.35, 0.43
Race/Ethnicity								
Non-Hispanic White (reference)								
Hispanic	-1.63	-10.86, 7.59	0.50	-0.16, 1.15	0.19	-0.48, 0.85	-0.25	-0.88, 0.39
Black	-3.62	-12.95, 5.72	0.79	0.13, 1.46	0.37	-0.31, 1.05	0.38	-0.27, 1.02
Asian/PI	11.96	-1.78, 25.71	0.34	-0.64, 1.32	-0.09	-1.08, 0.91	0.33	-0.62, 1.28
Other	9.14	-2.14, 20.42	-0.16	-0.97, 0.64	0.23	-0.59, 1.05	0.02	-0.76, 0.80
Region								
Mid-west (reference)								
West	-5.41	-13.30, 2.48	0.32	-0.25, 0.88	-0.04	-0.61, 0.53	0.06	-0.49, 0.60
South	-0.27	-7.44, 6.89	0.26	-0.25, 0.77	0.22	-0.30, 0.74	0.16	-0.34, 0.65
North-east	-0.84	-9.32, 7.64	0.20	-0.41, 0.80	0.21	-0.41, 0.83	0.21	-0.37, 0.80
Smoking status								
Current	20.68	14.40, 26.97	-1.03	-1.48, -0.58	-0.18	-0.63, 0.28	-0.25	-0.69, 0.18
Former	7.49	0.54, 14.45	-0.70	-1.19, -0.20	-0.13	-0.63, 0.38	-0.23	-0.71, 0.25
Condition								
Neutral (reference)								
Fear	-8.82	-18.22, 0.57	-0.49	-1.16, 0.18	0.33	-0.36, 1.01	-0.36	-1.01, 0.29
Anger	-0.38	-8.78, 8.02	-0.63	-1.23, -0.03	-0.37	-0.98, 0.24	-0.50	-1.08, 0.08
Sadness	5.87	-2.69, 14.44	-0.21	-0.82, 0.40	0.01	-0.62, 0.63	-0.23	-0.82, 0.36
Disgust	1.73	-6.05, 9.50	-0.30	-0.86, 0.25	0.21	-0.35, 0.78	-0.59	-1.13, -0.06
r^2	0.13		.10		.02		.03	

Note: B=Unstandardized coefficients, CI=Confidence interval

Regression analyses of anger, sociodemographics, smoking status and experimental condition on smoking-related perceptions

			Perception of Responsibility					
	Perception of health risk		Public policies		Someone		Tobacco companies	
Emotion	B	95% CI	B	95% CI	B	95% CI	B	95% CI
Anger	3.21	0.82, 5.60	0.22	0.05, 0.39	0.27	-0.10, 0.44	0.28	0.12, 0.45
Female	4.83	-0.78, 10.43	0.45	0.05, 0.85	-0.29	-0.69, 0.11	0.03	-0.36, 0.41
Race/Ethnicity								
Non-Hispanic White (reference)								
Hispanic	-1.63	-10.89, 7.62	0.50	-0.16, 1.15	0.19	-0.48, 0.85	-0.25	-0.88, 0.39
Black	-4.92	-14.26, 4.42	0.72	0.06, 1.38	0.35	-0.32, 1.02	0.32	-0.32, 0.95
Asian/PI	13.52	-0.21, 27.26	0.41	-0.56, 1.39	-0.10	-1.08, 0.88	0.38	-0.56, 1.32
Other	8.80	-2.51, 20.12	-0.17	-0.97, 0.63	0.28	-1.08, 0.88	0.04	-0.74, 0.81
Region								
Mid-west (reference)								
West	-5.91	-13.84, 202	0.28	-0.28, 0.84	-0.09	-0.66, 0.48	0.01	-0.53, 0.55
South	-0.27	-7.46, 6.93	0.25	-0.26, 0.76	0.18	-0.34, 0.69	0.13	-0.37, 0.62
North-east	-1.21	-9.75, 7.33	0.16	-0.44, 0.77	0.13	-0.48, 0.74	0.15	-0.43, 1.32
Smoking status								
Current	20.80	14.48, 27.11	-1.02	-1.46, -0.57	-0.13	-0.58, 0.32	-0.22	-0.65, 0.21
Former	6.96	0.00, 13.93	-0.72	-1.22, -0.23	-0.12	-0.62, 0.38	-0.25	-0.72, 0.23
Condition								
Neutral (reference)								
Fear	-3.28	-11.95, 5.39	-0.21	-0.83, 0.40	0.37	-0.36, 1.01	-0.14	-0.73, 0.46
Anger	-3.76	-13.66, 6.14	-0.93	-1.63, -0.22	-0.98	-0.98, 0.24	-1.00	-1.67, -0.32
Sadness	5.54	-3.08, 14.16	-0.25	-0.86, 0.37	-0.07	-0.62, 0.63	-0.29	-0.88, 0.30
Disgust	-0.08	-8.21, 8.05	-0.45	-1.02, 0.25	-0.04	-0.35, 0.78	-0.82	-1.37, -0.26
r^2	0.12		.10		.04		.04	

Note: B=Unstandardized coefficients, CI=Confidence interval

Regression analyses of sadness, sociodemographics, smoking status and experimental condition on smoking-related perceptions

			Perception of Responsibility					
	Perception of health risk		Public policies		Someone		Tobacco companies	
Emotion	B	95% CI	B	95% CI	B	95% CI	B	95% CI
Sadness	3.63	1.36, 5.90	0.32	0.16, 0.48	0.25	0.08, 0.41	0.41	0.26, 0.57
Female	4.46	-1.14, 10.06	0.40	0.01, 0.80	-0.31	-0.71, 0.10	-0.03	-0.40, 0.35
Race/Ethnicity								
Non-Hispanic White (reference)								
Hispanic	-1.74	-10.97, 7.49	0.49	-0.16, 1.14	0.18	-0.49, 0.84	-0.26	-0.88, 0.36
Black	-5.00	-14.31, 4.31	0.71	0.06, 1.37	0.34	-0.33, 1.01	0.31	-0.32, 0.93
Asian/PI	11.56	-2.22, 25.34	0.22	-0.75, 1.20	-0.22	-1.21, 0.77	0.14	-0.79, 1.07
Other	8.16	-3.10, 19.43	-0.21	-1.00, 0.59	0.22	-0.59, 1.03	-0.02	-0.78, 0.74
Region								
Mid-west (reference)								
West	-5.62	-13.52, 2.28	0.30	-0.26, 0.85	-0.06	-0.63, 0.51	0.03	-0.50, 0.56
South	-0.28	-7.45, 6.89	0.24	-0.27, 0.74	0.19	-0.33, 0.70	0.11	-0.38, 0.59
North-east	-0.75	-9.24, 7.73	0.18	-0.42, 0.78	0.18	-0.43, 0.79	0.18	-0.40, 0.75
Smoking status								
Current	20.56	14.27, 26.84	-1.02	-1.47, -0.58	-0.16	-0.61, 0.30	-0.23	-0.65, 0.20
Former	6.24	-0.71, 13.19	-0.78	-1.27, -0.29	-0.17	-0.67, 0.33	-0.33	-0.79, 0.14
Condition								
Neutral (reference)								
Fear	-3.47	-12.12, 5.18	-0.24	-0.85, 0.37	0.37	-0.25, 0.99	-0.17	-0.76, 0.41
Anger	-3.53	-12.80, 5.74	-1.08	-1.73, -0.43	-0.83	-1.49, -0.16	-1.17	-1.79, -0.54
Sadness	-1.60	-11.55, 8.36	-0.90	-1.60, -0.20	-0.54	-1.25, 0.18	-1.12	-1.79, -0.45
Disgust	1.19	-6.65, 9.02	-0.41	-0.96, 0.15	0.10	-0.46, 0.66	-0.76	-1.29, -0.23
r^2	0.12		.12		.04		.07	

Note: B=Unstandardized coefficients, CI=Confidence interval

Regression analyses of disgust, sociodemographics, smoking status and experimental condition on smoking-related perceptions

			Perception of Responsibility					
	Perception of health risk		Public policies		Someone		Tobacco companies	
Emotion	B	95% CI	B	95% CI	B	95% CI	B	95% CI
Disgust	3.94	0.86, 7.03	0.05	-0.17, 0.27	0.08	-0.14, 0.30	0.18	-0.04, 0.39
Female	4.95	-0.65, 10.55	0.47	0.08, 0.87	-0.26	-0.66, 0.15	0.05	-0.33, 0.44
Race/Ethnicity								
Non-Hispanic White (reference)								
Hispanic	-1.27	-10.53, 7.99	0.50	-0.16, 1.16	0.19	-0.48, 1.02	-0.23	-0.87, 0.41
Black	-5.29	-14.64, 4.06	0.72	0.05, 1.39	0.34	-0.33, 0.86	0.30	-0.34, 0.95
Asian/PI	13.03	-0.73, 26.80	0.43	-0.55, 1.41	-0.08	-1.07, 1.02	0.38	-0.57, 1.33
Other	7.25	-4.07, 18.58	-0.23	-1.04, 0.58	0.20	-0.62, 0.92	-0.07	-0.85, 0.72
Region								
Mid-west (reference)								
West	-5.18	-13.10, 2.75	0.32	-0.24, 0.89	-0.04	-0.61, 0.54	0.07	-0.48, 0.62
South	0.13	-7.06, 7.32	0.29	-0.22, 0.80	0.23	-0.29, 0.75	0.17	-0.32, 0.67
North-east	-0.32	-8.83, 8.19	0.23	-0.38, 0.84	0.22	-0.40, 0.83	0.24	-0.35, 0.82
Smoking status								
Current	20.57	14.26, 26.88	-0.73	-1.23, -0.23	-0.17	-0.63, 0.28	-0.26	-0.69, 0.18
Former	7.14	0.17, 14.11	-0.73	-1.23, -0.60	-0.13	-0.63, 0.37	-0.25	-0.73, 0.23
Condition								
Neutral (reference)								
Fear	-4.83	-13.64, 3.99	-0.21	-0.83, 0.42	0.37	-0.26, 1.01	-0.18	-0.79, 0.42
Anger	-7.03	-18.86, 4.79	-0.55	-1.39, 0.30	-0.54	-1.39, 0.32	-0.79	-1.61, 0.02
Sadness	6.73	-1.86, 15.32	-0.18	-0.79, 0.44	0.02	-0.60, 0.64	-0.19	-0.78, 0.40
Disgust	-10.08	-23.04, 2.88	-0.41	-1.33, 0.52	-0.04	-0.97, 0.90	-1.12	-2.01, -0.23
r^2	0.12		.09		.02		.03	

Note: B=Unstandardized coefficients, CI=Confidence interval

Appendix E. Correlation table of emotions and perception outcomes

	1	2	3	4	5	6	7	8
Emotion								
1. Afraid	1							
2. Angry	.39**	1						
3. Sad	.31**	.55**	1					
4. Disgusted	.21**	.61**	.25**	1				
Perception outcomes								
5. Health risk perceptions	.11*	.10*	.16**	0.08	1			
6. Perception of responsibility- Public policies	0.08	0.06	.10*	-0.03	.12**	1		
7. Perception of responsibility- Someone	0.03	0.07	0.06	0.01	0.07	.42**	1	
8. Perception of responsibility- Tobacco companies	0.08	.09*	.16**	-0.03	.15**	.42**	.62**	1

Note: ** Correlation is significant at the 0.01 level (2-tailed),
* Correlation is significant at the 0.05 level (2-tailed).

Chapter 4

Paper 3: What factors influence advocacy for smoking bans? Examination of discrete emotions, attitudes, and sociodemographics.

What factors influence advocacy for smoking bans? Examination of discrete emotions, attitudes, and sociodemographic characteristics

Abstract

Smoke-free laws are important in improving health for workers and the population as a whole. Implementing comprehensive smoking bans in workplaces, bars, and restaurants have led to decreases in hospitalizations and deaths for heart and respiratory diseases. Yet, many loopholes in the laws exist that still expose people to secondhand smoke. For example, in California smoking policies prohibit smoking in enclosed places of employment. Yet places such as hotel rooms, private residences, retail tobacco shops and lounges, and patient smoking areas in long-term health facilities are exempt from the smoking ban law.

The purpose of this study was to examine factors that predict intentions to advocate for smoking ban policies. In various multivariate models, the predictive value of discrete emotions, as well as attitudes towards smoking bans and sociodemographics were analyzed. Results showed sociodemographic characteristics and smoking ban attitudes were significantly associated with various smoking ban advocacy intentions related to permanent and temporary living spaces, public areas, and in one's own personal driving vehicle were examined. On the other hand, discrete emotions were not associated with smoking ban advocacy intentions.

While policy preferences have shown to be shaped by emotional information, fear, anger, sadness, and disgust were not shown to be associated with intentions to advocate for smoking ban policies. However, it is possible that other discrete emotions such as worry or positive emotions such as hope could influence smoking ban advocacy intentions. Future research is needed to explore the association of other discrete emotions and advocacy intentions.

Based on a recent review of the literature (see Chapter 2), there was only one study that examined the effect of discrete emotions on smoking-related policies. The study, by Quick et al., found that anger was significantly associated with favorable attitudes toward clean indoor air policies (Quick 2009). Fear and sadness have been shown to increases intentions, however, how discrete emotions relate to smoking-related policy intentions is unclear. The aim of this study is to examine the relationship of discrete emotions (fear, anger, sadness, and disgust), as well as attitudes towards smoking bans and sociodemographics, on intentions to advocate for smoking ban policies. It is hypothesized that anger, as well as fear and sadness would increase smoking-related policy intentions.

Methods

Participants

Participants were mostly female (61.2%), non-Hispanic White (70.2%), employed (71.2%), had completed more than a high school education (84.5%), made less than $41,000 a year (54.4%), and resided in the southern part of the U.S. (36.1%). Mean age was 38.1 (SD = 12.6) years. More than half of the sample self-reported as a never smoker (56.6%), 21.6% were current smokers, and 21.8% were former smokers. Current smokers smoked a mean of 8.9 (SD = 7.6) cigarettes on a typical day. When asked whether smoking cigarettes or e-cigarettes were allowed in their current place of residence, over half reported smoking was allowed. Only 13.3% reported smoking cigarettes were allowed in their workplace. See Table 4.1.

Recruitment

Participants were active subscribers to the website Mechanical Turk (MTurk). Inclusion criteria were being able to read English, being at least 18 years of age and a member of MTurk. All members on MTurk who met inclusion criteria were able to participate in the study.

MTurk is a public website open to all individuals from throughout the United States. As a result a national sample was expected. MTurk has become a popular tool for behavioral researchers for its ease in recruitment and payment. Incentives for Workers is collected on Amazon.com via gift certificate, or transferred to a Worker's U.S. bank account. Incentive structure commonly seen on MTurk has been as low as $0.01, with many companies offering $0.10. One study examined MTurk as a tool for various types of experimental behavioral research and found many participants were willing to take part in a 15–30 minute study even when offered $0.75 (Crump et al., 2013). They were also able to recruit very quickly and run 40 participants within 2 hours time (Crump et al., 2013). As of 2015, there were reportedly over 500,000 *Turkers*, and since then this number has grown substantially (Hitlin, 2016).

Study Procedures

Data was used from the Emotions and Health Study, an experimental study aimed to examine the impact of discrete emotions on smoking-related cognitive outcomes. Participants were randomized to either a control or one of four experimental groups (fear, anger, sadness, or disgust). Participants in the control group watched a short film clip meant to elicit no emotion (a neutral film clip) and participants in the experimental groups viewed a short film clip representing one of four target emotions: anger, fear, sadness and disgust. After the emotion manipulation, smoking-related attitudes and intentions were assessed. The UC Merced IRB approved all study procedures.

Due to the experimental design, participants were masked to the purpose of the study in order to decrease bias. Instead participants were told the study purpose is to examine emotions and health. At the last page of the study survey participants were debriefed on the real purpose of the study.

All study procedures occurred online on Qualtrics. MTurk members who met inclusion criteria (at least 18 years of age, read English) were able to view the link to the study on MTurk.

Informed consent was obtained through an online procedure before the start of the study on Qualtrics. The online consent form enables the participant themselves to review the form, which indicates the study procedures, and to indicate whether they agree to participate in the study by clicking on the button at the bottom of the page. If participants click that they do not agree the participant will not continue to the study survey and will be debriefed and thanked for their time.

Participants who provided informed consent, confirmed they met inclusion criteria, and acknowledged receipt of information on one's rights in a research study, were then randomized into one of five conditions (control, fear, anger, sadness, or disgust condition). Depending on condition, participants watched a film that elicited fear, anger, sadness, disgust, or no specific emotion. Prior to watching the film clip they were instructed to be in a place where they could hear and see the movie without distractions. Immediately after watching the short movie clip participants' smoking-related attitudes and intentions were assessed. In addition, questions about the film clips, current affect, smoking history, and sociodemographics were collected. At the end of the study, participants watched a second film that was meant to elicit positive affect. The purpose of the second clip was to ensure that participants not leave the study with any residual negative affect. After completing the study participants received compensation in the amount of $0.25, which was deposited into their MTurk account. All study procedures were approved by the UC Merced IRB.

Study Measures

Measures of smoking ban advocacy intentions. The effects on two types of intentions were examined: collective and behavioral intentions. Collective intentions were assessed using 6 items rated on an 8-point Likert scale (0 = Extremely unlikely, 7 = Extremely likely) and asking participants how likely they would support a law banning smoking in hospitals, shared living spaces, and in open public areas such as parks; and

vote for smoking bans in bars and restaurants and while driving. Items were summed and averaged to create an index score (alpha = .89).

Behavioral intentions were assessed based on responses to 18 items asking participants to imagine they were in an area or situation with different types of smoking policies. The 6 scenarios included booking a hotel room or Airbnb that smells like cigarette smoke, being asked to sign a petition for smoke-free housing, being in a public area (i.e. a park) with and without a smoke-free policy when someone starts smoking, seeing someone smoke near children, and seeing someone smoke near a pregnant woman. In the smoke smelling hotel room or Airbnb scenario, participants rated how likely they would ask to be moved to another room and how likely they would ask for a refund. In the housing scenario, participants were asked how likely they would sign a petition for smoke-free housing. In the scenarios with a smoker, participants rated how likely they would ask the smoker to move, to stop smoking, move somewhere else themselves, or ask someone else to tell the smoker to stop smoking. All ratings were based on an 8-point Likert scale (0 = Extremely unlikely, 7 = Extremely likely). Items were summed and averaged to create an index score (alpha = .93).

Smoking Ban Attitudes. Participants were asked if smoking should be allowed in all areas, some areas, or no areas of bars, restaurants, concert venues, outdoor sports arenas, hospitals, casinos, airports, hotels, the workplace, and in the household. Items were summed and averaged to create an index score (alpha = .90). Participants were also asked to what extent they agree (1 = Strongly disagree to 4 = Strongly agree) smoking be allowed in cars, near children, and in public housing units.

Discrete Emotions. Fear, anger, sadness, and disgust were rated on a 5-point scale (1 = very slightly/not at all, 5 = extremely). The assessment was based on the 60-item Positive and Negative Affect Scale- Extended version (PANAS-X) (Watson & Clark, 1999). Participants rated their fear, anger sadness, and disgust after watching a film clip.

Movie Questions. Participants were asked if they had seen the film before and if they closed their eyes or looked away during the scene.

Smoking History. Current smoking status (*current*, *former*, or *non-smoker*) was assessed. If a participant identified as a current smoker the amount of cigarettes smoked on a typical day was assessed. Smoking restrictions in the home and at the workplace were also assessed. E-cigarette restrictions in the home were also assessed.

Sociodemographics. Gender, age, education level, race and ethnicity, geographic location, income level, and occupation were also assessed.

Analyses

Descriptive statistics (means, frequencies) were used to describe the sample and the smoking ban attitude, collective intention and behavioral intention items. Multiple regression analyses were used to investigate the effect of smoking ban attitudes, relevant sociodemographic factors, and discrete emotions on various smoking ban advocacy intentions. First, univariate regression analyses were conducted. Specifically, three regression analyses examined attitudes allowing smoking in hotels on intentions to book a hotel that does not have a smoke-free policy, intention to ask to move to another room if the room smells like smoke, and intention to ask for a refund if the room smells like

smoke. Three other regressions examined attitudes regarding smoking in restaurants, bars, and hospitals, on intentions to vote to ban smoking in restaurants, vote to ban smoking in bars, and general support to ban smoking in hospitals, respectively. Two regression analyses examined allowing smoking in public housing units on intentions to sign a petition for smoke-free buildings, and general support of a law to ban smoking in shared living spaces. Four regression models were run to examine allowing smoking in cars when no one else is present but the driver, when another adult is present, when children are present, and when a pregnant woman is present on intentions to ban smoking in cars while driving. Attitude of areas where smoking should be allowed (as a composite score) on collective intentions and behavioral intentions were then examined. Secondly, multivariate regression analyses were conducted that simultaneously included covariates significantly associated in univariate analyses.

Results

For most participants (84.0%) it was their first time seeing the film clip. Only 11.0% reported closing their eyes sometime during the film clip.

Smoking ban attitudes

Over 50% of participants responded that smoking should be allowed in all and some areas of bars, outdoor sports arenas, casinos, and in the household. On the other hand, over 50% of participants responded that smoking should not be allowed in any area of hospitals, restaurants, the workplace, hotels/Airbnbs, and airports. See Figure 4.1. When participants were asked where smoking should be allowed, there was high agreement (strongly agree and agree) that smoking should be allowed inside cars when no one else is present besides the driver. Smoking near children, in cars when others are present, and in public housing units was seen as unfavorable. See Figure 4.2.

Collective and behavioral intentions

There was high support for smoking bans in public areas where other people besides the smoker would be such as hospitals and restaurants (see Table 4.2 collective intention items). Less support for smoking restrictions was seen for smoking when the smoker is isolated from other people such as driving a car by themselves. Overall people were more likely to avoid secondhand smoke exposure by moving away if someone started smoking near them, and less likely to have direct communication with a smoker to tell them to stop smoking (see Table 4.2 behavioral intentions items). People were also more likely to support smoke-free buildings by signing a petition and less likely to stay in a hotel room or Airbnb if it smelled like smoke. Most would request to move to another room and ask for a refund.

Emotions, attitudes, and advocacy intentions

Neither fear, nor anger, nor sadness, nor disgust was significantly associated with any of the attitude items (see Table 4.3). In regression analyses, fear, anger, sadness, and disgust showed no significant effect on intentions.

Attitudes on smoking bans in certain areas were all significantly associated with their corresponding smoking ban advocacy intention. Attitude that smoking should not be allowed in hotels was negatively associated with booking a hotel without a smoke-free policy (B = -1.38, p = .000), positively associated with asking to move to another room if the room smelled like smoke (B = 1.75, p = .000), and positively associated with asking for a refund if the room smelled like smoke (B = 1.90, p = .000).

Smoking in no area of a hospital, restaurants, and bars, were all significantly associated with general support for smoking bans in hospitals (B = 2.59, p = .000), intention to vote to ban smoking in restaurants (B = 2.87, p = .000), and intention to vote to ban smoking in bars (B = 2.94, p = .000), respectively. Allowing smoking in public housing units was negatively associated with general support of a law to ban smoking in shared living spaces (B = -1.22, p = .000) and signing a petition for a smoke-free building (B = -1.26, p = .000). Allowing smoking in cars when no one else is present (B = -1.44, p = .000), with another adult (B = -1.24, p = .000), with children present (B = -0.69, p = .000) and with a pregnant woman present (B = -0.75, p = .000) were all significantly associated with decreased intentions to vote in favor to ban smoking while driving. Attitudes all remained significant after controlling for significant covariates (see Tables 4.4 to 4.7). When fear, anger, sadness, or disgust was entered into the models attitudes remained significant (data not shown).

Examining composite scores of collective intentions and behavioral intentions to support smoking bans, attitudes remained to be significantly associated. In addition, females and non-Hispanic Whites had lower behavioral intentions, while non-smokers had higher behavioral intentions. This indicates females and non-Hispanic Whites were less likely to actively restrict themselves and vulnerable people (children and pregnant women) from secondhand smoke exposure. Non-smokers, on the other hand, were more likely to actively remove themselves and vulnerable people (children and pregnant women) from secondhand smoke exposure. Non-Hispanic Whites also had lower collective intentions, indicating a decreased likelihood to support smoking ban policies. See Table 4.8.

Discussion

In the present study, predictors of smoking ban advocacy intentions related to permanent and temporary living spaces, public areas, and in one's own personal driving vehicle were examined. Sociodemographic characteristics and smoking ban attitudes were significantly associated with various smoking ban advocacy intentions. On the other hand, discrete emotions were not associated with smoking ban advocacy intentions.

Discrete emotions and smoking policy-related intentions

Discrete emotions effect policy intentions differently than individual intentions. In a previous study (Chapter 2), discrete emotions were significantly associated with individual intentions. Sadness predicted intention to quit smoking after viewing a pictorial warning on the risk of harming other people and on the risk of a mouth disease (Timmers & van der Wijst, 2007). Fear increased intention to talk to friends who smoke about cessation (Wong et al., 2013), decreased intention to try a cigarette (Timmers &

van der Wijst, 2007), and significantly increased intention to quit smoking (Kees et al., 2010; Sutton & Eiser, 1984; Sutton & Hallett, 1989). However, in this current study, fear, anger, sadness, and disgust were not significant factors to any of the policy-level intentions.

It is possible that other discrete emotions would have an effect on smoking policy-related intentions. In a study of emotions on global warming policy support, worry, interest, and hope were associated with support for global warming policies (i.e. regulate carbon dioxide, sign international treaty to cut emissions), after controlling for values, affect (holistic affect and affective images), and sociodemographics (N. Smith & Leiserowitz, 2014). Interestingly, the authors also examined fear and found its effect to be less than worry's on climate change support and reasoned that proximity of the event to fear may also play a role. For example, in their study on climate change which poses risks such as depleting the earth's natural resources seem far in the future, fear was thought to play less of a role than worry. Worry occurs in response to threats for forthcoming potential problems and motivates information-seeking and monitoring coping strategies (Davey, Hampton, Farrell, & Davidson, 1992). These attributes of worry may be more salient than fear's (which see events as uncontrollable and seeks activities that increase certainty), when it comes to intentions to advocate for policy changes that do not necessarily guarantee resolution of the event causing the threat. The applicability of hope as an emotion in motivating behavior change has only recently begun to be explored. Hope's attributes include enhancement of self-efficacy and positive coping, both of which can lead to motivate positive health-related behaviors. Nabi and colleagues have started to examine the response of hope in persuasive messaging (or what they call fear-appeals) on health outcomes and found that hope is associated with sun safety intentions and behaviors (Nabi & Myrick, 2018). In another recent study, the interaction of hope and fear increased quit attempts among those with high socioeconomic status (S. Durkin, Bayly, Brennan, Biener, & Wakefield, 2018). Therefore, it is also possible that in this study of smoking, where the health risks such as premature death and disability may seem too far out in the future, and positive coping and high self-efficacy is important in changing smoking behaviors, worry or other positive emotions such as hope, could have an effect on smoking-related policy intentions.

Smoking ban compliance and an ambassador program on a college campus

Smoking ban policies usually gain support after policies are in place; and this is not only seen in the U.S. but also in other countries throughout Europe (McMillen et al., 2018; Mons et al., 2012). Importance of smoking bans include not only decreasing smoking, but also reducing smoking attitudes over time (Bennett, Deiner, & Pokhrel, 2017). However after policies are in place and support given, the issue of enforcement and compliance challenges remains (Fallin-Bennett, Roditis, & Glantz, 2017). Findings from this study show that people are less likely to confront a smoker, even if that smoker is smoking in an area with a smoking ban policy. Yet, confrontation is more likely to happen when exposure is to a vulnerable group such as children.

One limitation to this study is actual behavior was not assessed. However, there are studies that have examined compliance strategies that involve approaching smokers. One study examined the feasibility of an ambassador program that aimed to promote an

environment of compliance. Ambassadors were students who were educated about tobacco policies and trained on how to approach and communicate with policy violators. While mostly observational, this study was shown to be effective in increasing policy compliance (Ickes, Rayens, Wiggins, & Hahn, 2015). Future research is warranted to examine the effect of discrete emotions on smoking-related advocacy behaviors.

Anti-tobacco industry attitudes

Future research could also examine the effect of emotions on anti-tobacco industry attitudes, which has been shown to be associated with awareness of tobacco control ads and information (Hammond, Fong, Zanna, Thrasher, & Borland, 2006). Moreover, anti-tobacco industry attitudes has been shown to deter smoking in adolescents and young adults, and increase intentions to quit (Bernat, Erickson, Widome, Perry, & Forster, 2008; Hersey et al., 2003; Ling, Neilands, & Glantz, 2007; Anna V Song & Glantz, 2008). Population level interventions such as the American Legacy Foundation's *truth* campaign (Allen, Vallone, Vargyas, & Healton, 2009), a mass media anti-tobacco campaign, have been successful in part by their approach to denormalize attitudes toward tobacco use and the tobacco industry (Malone, Grundy, & Bero, 2012).

In the current study, target discrete emotions were not associated with smoking ban attitudes (Table 4.3). How and if anti-tobacco industry messaging relates to discrete emotions is unclear. One study using data from the truth campaign found that persuasiveness, receptivity to the ad, and engaging in conversation about the ad was heightened in those who felt anger and empowered by the ad (Ilakkuvan, Turner, Cantrell, Hair, & Vallone, 2017). However, less than half the sample experienced retrospective anger from the *truth* ads examined, and the authors did not examine the emotional reactions from the ads and thus did not examine the emotional effect from the *truth* ads on outcomes. Unpacking the emotional effects could be one way in understanding the mechanisms that contribute to the effectiveness of mass media campaigns like the truth campaign.

Strengths and limitations

This is the first study to my knowledge that has focused on the influence of discrete emotions (versus valence emotions or mood states) on smoking ban advocacy intentions. Examination of advocacy intentions (i.e. vote for a law banning smoking in hotel rooms, ask someone to not smoke in my presence) is an under-researched topic and this is one of the first studies to examine this topic in a smoking context. This study contributes to the ATF literature and to the understanding of the relationship between 4 discrete emotions (fear, anger, sadness, and disgust) and health-related outcomes. Though no effect was found for fear, anger, sadness, and disgust, this is still a notable finding demonstrating the limit of these four discrete emotions in influencing intentions at a different ecological level than the individual level of intentions (i.e. intention to quit smoking). Data in this study is limited by self-reported emotions based on exposure to film clips. Because of the nature of this online experimental study other environmental stimuli cannot be accounted for, as would be the case if participants were to view the film clips in a monitored and controlled environment. While distractions could have played a

part in this study, there were checks throughout the online survey to ensure participants indeed watched the film clip to its entirety.

Conclusion

Smoke-free laws are important in improving health for workers and the population as a whole. Implementing comprehensive smoking bans in workplaces, bars, and restaurants have led to decreases in hospitalizations and deaths for heart and respiratory diseases (Centers for Disease Control and Prevention, 2016). While there is ample evidence of the benefit of smoke-free laws, many cities in the U.S. have yet to adopt comprehensive smoke-free laws (Centers for Disease Control & Prevention, 2012). In addition, barriers exist for voluntary enforcement of smoking bans (Fallin-Bennett et al., 2017). Results from the current study indicate that there is strong support for restricting smoking in most public areas and around children and pregnant women. Moreover, this support for restricting smoking is strongly associated with advocacy intentions. Understanding what emotions, if any, can increase smoking-related advocacy intentions remains unknown. Further research is needed to explore the applicability of discrete emotions on smoking-related advocacy intentions.

Table 4.1 *Sample Characteristics (N = 399)*

	Full Sample	
Variable	n	%
Sex		
Male	151	37.8
Female	244	61.2
Other	1	0.3
Age, mean (SD)	396	38.1 (12.6)
Ethnicity		
Non-Hispanic White	280	70.2
Hispanic	44	11.0
Black	28	7.0
Asian	28	7.0
Other	16	4.1
Education		
≤HS	59	14.8
>HS	337	84.5
Employed	284	71.2
Income		
≤$40K	217	54.4
>$41K	179	44.9
Region		
West	99	24.8
South	144	36.1
Mid-West	86	21.6
North-East	67	16.8
Smoking Status		
Never	226	56.6
Current	87	21.8
Former	86	21.6
Allowed to use cigarettes in:		
Residence	224	56.1
Workplace	53	13.3
Allowed to use e-cigarettes in residence	235	58.9

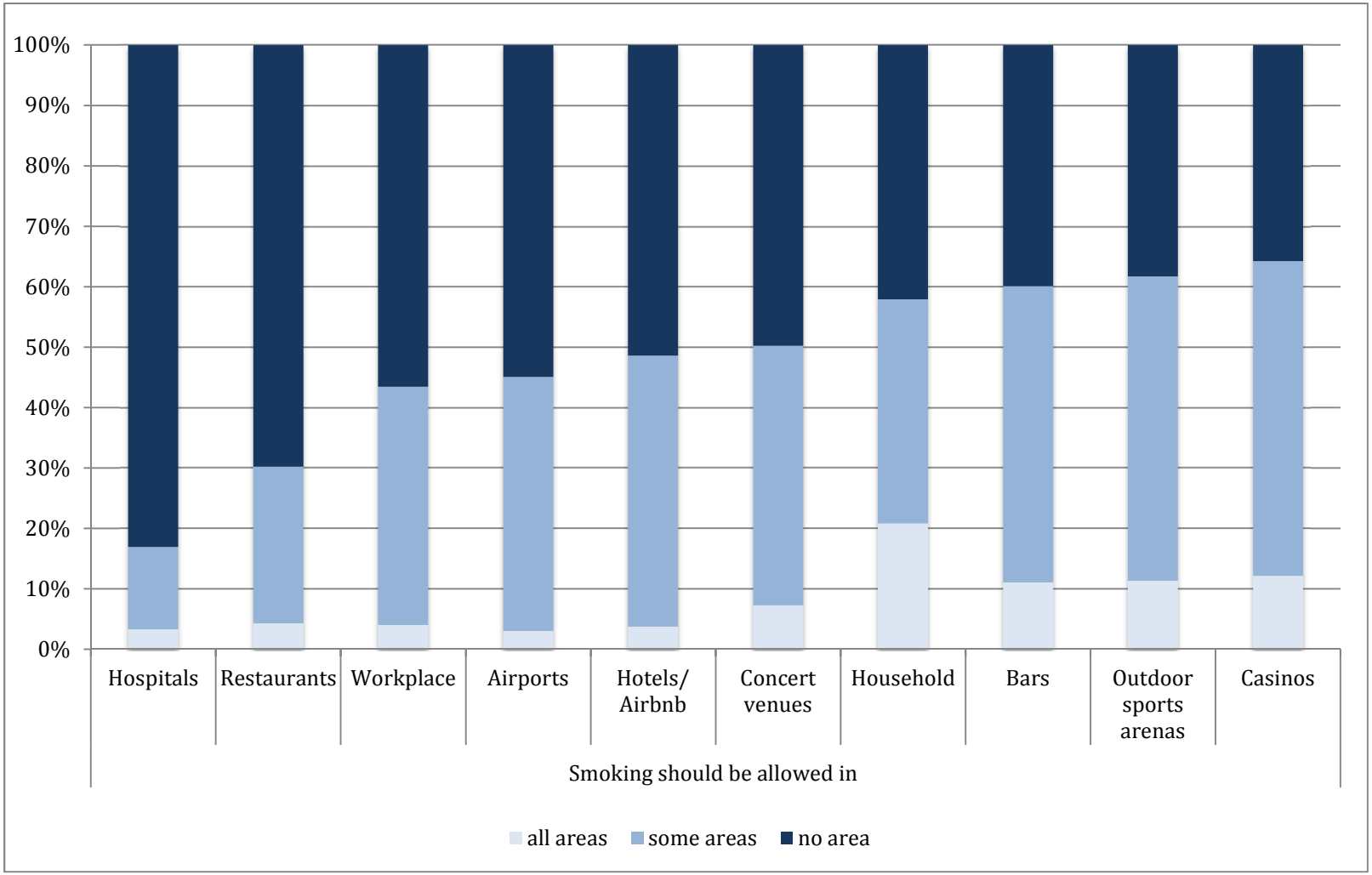


Figure 4.1 Smoking Ban Attitudes on Areas to Allow Smoking

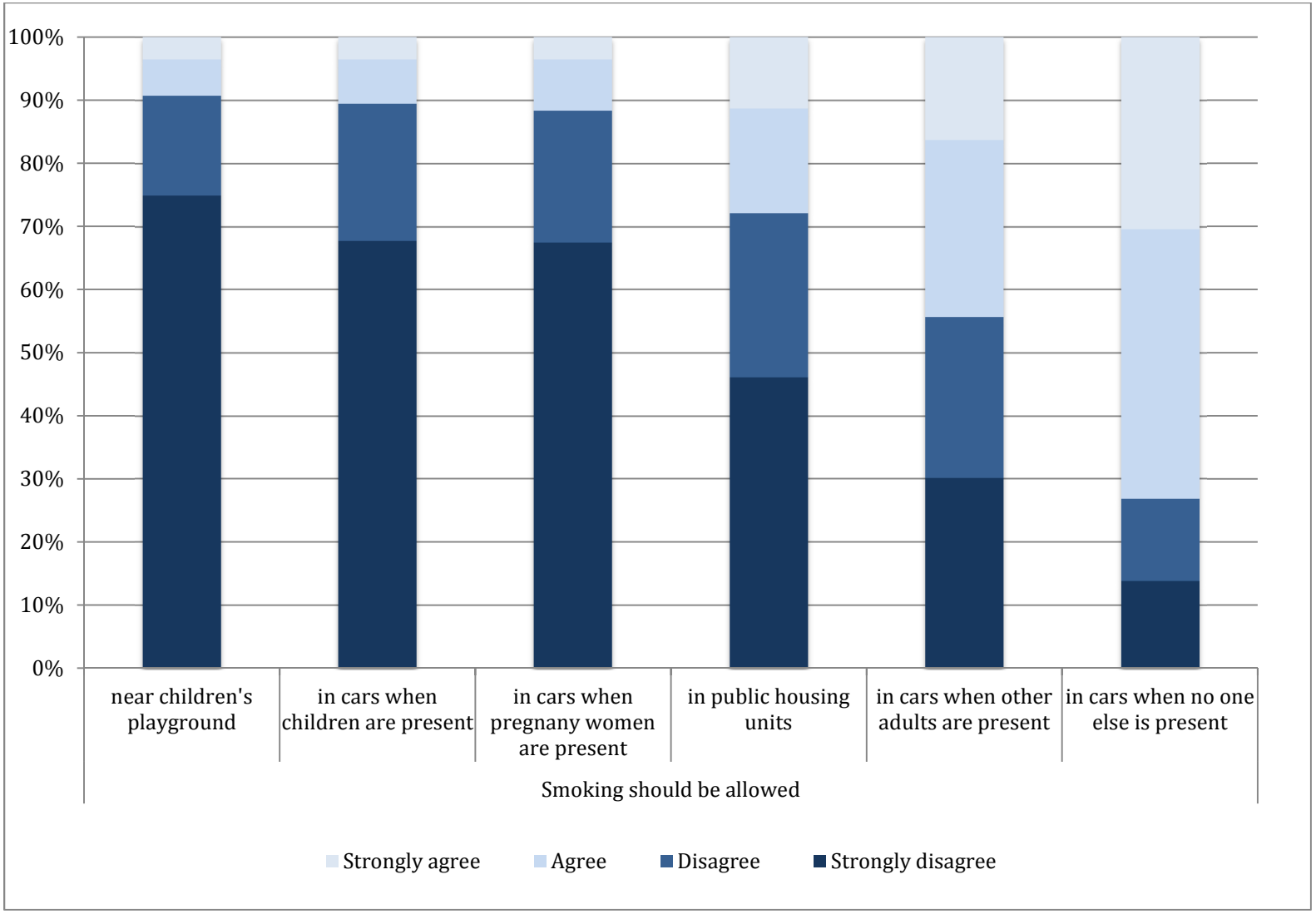


Figure 4.2 Smoking Attitudes on Where Smoking Should be Allowed

Table 4.2 *Collective and Behavioral Intention Indices*

	Mean	SD	Alpha
Collective intention items			0.89
I will support a law banning smoking in hospitals	6.73	2.17	
I will vote in favor for a law to ban smoking in restaurants	6.10	2.22	
I will support a law banning smoking in free public areas	5.79	2.41	
I will vote in favor for a law to ban smoking in bars	5.42	2.54	
I will support a law banning smoking in shared living spaces	5.29	2.65	
I will support a law banning smoking while driving	4.21	2.74	
Behavioral intention items			0.93
Smell smoke in hotel/Airbnb- request to move to another room	6.03	2.31	
Sign a petition for smoke-free building	5.84	2.43	
In a public space and someone smokes near you- move to another location	5.84	2.41	
In a smoke-free public space and someone smokes near you- move to another location	5.71	2.32	
Smell smoke in hotel/Airbnb- ask for a refund	4.97	2.31	
See someone smoke near children- ask the smoker to smoke somewhere else	4.93	2.42	
See someone smoke near pregnant woman- ask the smoker to smoke somewhere else	4.85	2.50	
See someone smoke near pregnant woman- ask the smoker to stop	4.39	2.56	
In a smoke-free public space and someone smokes near you- remind them of smoking ban	4.35	2.40	
See someone smoke near children- ask the smoker to stop	4.30	2.44	
In a smoke-free public space and someone smokes near you- ask smoker to smoke somewhere else	4.11	2.28	
See someone smoke near children- ask someone else to tell the smoker to stop	4.03	2.44	
See someone smoke near pregnant woman- ask someone else to tell the smoker to stop	4.01	2.50	
In a smoke-free public space and someone smokes near you- ask someone else to tell the smoker to stop smoking	3.64	2.25	
In a smoke-free public space and someone smokes near you- ask them to stop smoking	3.56	2.29	
In a public space and someone smokes near you- ask smoker to smoke somewhere else	2.72	2.12	
In a public space and someone smokes near you- ask someone else to tell the smoker to stop smoking	2.60	2.08	
In a public space and someone smokes near you- ask to stop smoking	2.52	2.05	

Note: Scales range from 1 (extremely unlikely) to 8 (extremely likely).

Table 4.3. *Correlation table of Emotions on Smoking Ban Attitudes*

Attitudes	Fear	Anger	Sadness	Disgust
Smoking cigarettes should be allowed:				
in restaurants	-0.01	-0.07	0.03	-0.03
in bars	0.03	-0.07	-0.01	-0.04
in hotels (including Airbnb rental)	0.06	-0.03	0.01	-0.02
in hospitals	-0.06	-0.08	0.04	0.00
in cars when no one else is present	-0.03	0.02	0.04	0.06
in cars when other adults are present	-0.03	0.05	0.07	0.04
in cars when children are present	-0.01	-0.08	-0.03	-0.08
in cars when pregnant women are present	0.00	-0.04	0.00	-0.06
in public housing (e.g. such as inside buildings with Section 8 subsidized housing units)	-0.07	-0.02	-0.05	-0.04

Table 4.4 *Univariate and Multivariate Regression Analyses of Emotions, Attitudes and Sociodemographics on Smoking Ban Intentions in Hotels/Airbnbs*

	Model 1 Univariate			Model 2 Multivariate		
	Book a hotel **without** a smoke-free policy	Room smells of smoke- ask to move to another room	Room smells of smoke- ask for a refund	Book a hotel **without** a smoke-free policy	Room smells of smoke- ask to move to another room	Room smells of smoke- ask for a refund
	B	B	B	B	B	B
Emotion						
Fear	-0.07	0.01	0.08			
Anger	0.06	-0.02	0.02			
Sadness	-0.03	-0.05	0.02			
Disgust	0.01	0.05	0.09			
Attitude of where to smoke in hotels/Airbnbs						
All/some areas (reference)						
No area	-1.38***	1.75***	1.90***	-1.34***	1.46***	1.70***
Sociodemographic characteristics						
Gender						
Male (reference)						
Female	-0.07	0.51*	0.42		0.31	
Age	-0.01	0.02	0.00			
Non-Hispanic White	0.03	-0.28	-0.67**			-0.55*
Education						
≤ HS (reference)						
> HS	-0.98**	1.042**	0.86**	-0.86**	0.82**	0.63*
Region						
West (reference)						
South	0.52	0.01	-0.13	0.54		0.01
Mid-west	0.49	-0.07	-0.13	0.45		0.28
North-east	0.76*	-0.57	-0.73*	0.78*		-0.44
Smoking status						
Current/former (reference)						
Non-smoker	-0.80	1.29***	1.29***		0.84***	0.74**
Experimental condition	0.06	0.01	0.00			

Note: B=Unstandardized coefficients

*p < .05, **p < .01, ***p < .001

Table 4.5 *Univariate and Multivariate Regression Analyses of Emotions, Attitudes and Sociodemographics on Smoking Ban Intentions in Hospitals, Restaurants and Bars*

	Model 1 Univariate			Model 2 Multivariate		
	General support to ban smoking in hospitals	Vote to ban smoking in restaurants	Vote to ban smoking in bars	General support to ban smoking in hospitals	Vote to ban smoking in restaurants	Vote to ban smoking in bars
	B	B	B	B	B	B
Emotion						
Fear	-0.04	0.04	0.08			
Anger	-0.02	-0.02	-0.02			
Sadness	0.05	0.03	-0.02			
Disgust	0.09	0.03	-0.01			
Attitude						
Smoking in no area of[a]						
Hospitals	2.59***			2.53***		
Restaurants		2.87***			2.76***	
Bars			2.94***			2.74***
Sociodemographic characteristics						
Gender						
Male (reference)						
Female	0.60**	0.62**	0.26	0.40*	0.45*	
Age	0.01	0.01	-0.00			
Non-Hispanic White	0.06	-0.18	-0.43			
Education						
≤ HS (reference)						
> HS	0.50	0.47	0.68			
Region						
West (reference)						
South	0.12	0.07	-0.07			
Mid-west	-0.32	0.03	0.00			
North-east	-0.16	0.22	0.43			
Smoking status						
Current/former						
Non-smoker	0.12	0.92***	1.49***		0.34	0.80***
Experimental condition	0.06	0.00	-0.05			

Note: [a]Reference group is all areas/some areas, B=Unstandardized coefficients
*p < .05, **p < .01, ***p < .001

Table 4.6 *Univariate and Multivariate Regression Analyses of Emotions, Attitudes and Sociodemographics on Smoking Ban Intentions in Public Housing*

	Model 1 Univariate		Model 2 Multivariate	
	Sign a petition for smoke-free building	General support of a law to ban smoking in shared living spaces	Sign a petition for smoke-free building	General support of a law to ban smoking in shared living spaces
	B	B	B	B
Emotion				
Fear	0.15	0.08		
Anger	0.12	0.05		
Sadness	0.15	0.03		
Disgust	0.15	0.07		
Attitude to allow smoking in public housing units	-1.22***	-1.26***	-1.02***	-1.18***
Sociodemographic characteristics				
Gender				
Male (reference)				
Female	0.40	0.70*		0.53*
Age	-0.01	-0.01		
Non-Hispanic White	-0.53*	-0.52	-0.14	
Education				
≤ HS (reference)				
> HS	0.82*	0.12	0.26	
Region				
West (reference)				
South	0.12	-0.02		
Mid-west	0.31	-0.17		
North-east	0.29	0.13		
Smoking status				
Current/former				
Non-smoker	2.02***	1.18***	1.44***	0.51*
Experimental condition	0.02	0.14		

Note: B=Unstandardized coefficients
*p < .05, **p < .01, ***p < .001

Table 4.7 *Univariate and Multivariate Regression Analyses of Emotions, Attitudes and Sociodemographics on Smoking Ban Intentions While Driving*

	Model 1 Univariate	Model 2a Multivariate	Model 2b Multivariate	Model 2c Multivariate	Model 2d Multivariate
	Vote in favor to ban smoking while driving	Vote in favor to ban smoking while driving	Vote in favor to ban smoking while driving	Vote in favor to ban smoking while driving	Vote in favor to ban smoking while driving
	B	B	B	B	B
Emotion					
Fear	-0.08				
Anger	0.04				
Sadness	0.09				
Disgust	0.02				
Attitude to allow smoking in:					
cars when no one else is present	-1.44***	-1.43***			
cars with another adult	-1.24***		-1.22***		
cars with children	-0.69***			-0.66***	
cars with pregnant woman	-0.75***				-0.72***
Sociodemographic characteristics					
Gender					
Male (reference)					
Female	-0.05				
Age	-0.02				
Non-Hispanic White	-0.74*	-0.15	-0.41	-0.66*	-0.65*
Education					
≤ HS (reference)					
> HS	-0.12				
Region					
West (reference)					
South	-0.17				
Mid-west	-0.72				
North-east	0.46				
Smoking status					
Current/former					
Non-smoker	1.43				
Experimental condition	0.02				

Note: B=Unstandardized coefficients
*p < .05, **p < .01, ***p < .001

Table 4.8 *Multivariate Regression Analyses of Attitudes on Smoking Ban Behavioral and Collective Intentions*

	Behavioral intentions			Collective intentions		
	B	CI	p	B	CI	p
Age	-0.01	-0.25, -0.00	.037	-0.00	-0.01, 0.01	.828
Female	-0.31	-0.61, -0.01	.043	0.09	-0.23, 0.42	.563
Non Hispanic White	-0.47	-0.79, -0.15	.004	-0.40	-0.75, -0.05	.025
Region- West	-0.22	-0.55, 0.12	.203	-0.14	-0.50, 0.22	.440
Attitude	1.14	0.79, 1.49	.000	2.71	2.34, 3.09	.000
Non-smoking status	0.52	0.21, 0.84	.001	0.21	-0.13, 0.54	.232

Note: B=Unstandardized coefficients, CI= confidence interval

Chapter 5
Dissertation Conclusion

This dissertation investigated the effect of emotion on tobacco-related outcomes. Based on a review of the literature, only a few studies (N=13) examined the effect discrete emotions had on smoking-related outcomes. Overall findings showed emotions play an important role in graphic health warnings. Studies on graphic health warnings on cigarette packages have shown that those that elicit strong emotional reactions were more likely to increase intentions to quit (Byrne et al., 2015; Kees et al., 2010), discourage people from smoking, (Cameron et al., 2015), and increase quit attempts (Hammond et al., 2004). Graphic warnings are also perceived to be more effective (Byrne et al., 2015; Hammond et al., 2004), than plain or text-based warnings. Most studies focused on the discrete emotion of fear and its effect on intentions to quit and in perceived anti-tobacco ad effectiveness. Other findings included a positive association with fear and smoking-related intentions to not smoke in nonsmokers, anger had an impact on attitudes towards indoor air policies, disgust is important in ad effectiveness, and sadness increases intentions to quit smoking. Further, the literature review revealed gaps that this dissertation project (Chapter 3 & 4) attempted to fill.

Based on the review of the literature, there were no studies that examined the effect of emotions on tobacco-related perceptions, and no studies on the effect of emotions on tobacco-related policy intentions. Perceptions and policy intentions are important in both decision-making and in decreasing smoking, yet not much has been done to understand these relationships. In this dissertation project an experimental study was conducted and found anger and sadness helpful in increasing smoking-related perceptions of health risk and responsibility. But in a third study aimed at investigating the applicability of discrete emotions on smoking-related policy intentions, emotions were found to have no effect.

Theoretical and practical implications

Based on work in the emotion and decision-making field, evidence has demonstrated the usefulness of discrete emotions (besides fear) in information processes. The appraisal tendency framework (ATF) (Lerner & Keltner, 2000; Lerner & Keltner, 2001), for example, explains that emotions, which are defined by appraisal dimensions (i.e. certainty, pleasantness) and themes, trigger an action tendency related to its cognitive appraisal of the event that elicited the emotion. Thus, emotions can have differential effects on decision-making and judgments. In addition, there is potential use of other emotional-appeals besides fear that can be helpful in anti-tobacco campaigns. Findings from this dissertation contribute to the ATF in its understanding of fear, anger, sadness, and disgust in changing perceptions. Specifically anger and sadness are able to change smoking-related perceptions of health risk and responsibility. This is inline with ATF as anger and sadness score high on other/situational responsibility on appraisal dimensions and have attributions to decrease trust and increase blame (Ferrer et al., 2016). This dissertation also contributes to the few studies of emotions and decision-making done within a smoking context. Novelty of graphic health warnings and mass media anti-tobacco campaigns are helpful in keeping messages effective. While GHWs and anti-

tobacco ads have relied on fear and disgust, practical implications from this study revealed that incorporating anger- and sadness-appeals might be useful in GHWs and anti-tobacco ads to change smoking-related perceptions.

Future research

The usefulness of emotions has been demonstrated, however many questions still remain unanswered. Perceptions of health risk are important in decreasing smoking initiation and perceptions of responsibility may be helpful in advocating for tobacco policy changes. Future studies are needed to fully understand how smoking-related perceptions of responsibility can affect smoking-related behavior, and to understand the impact of emotions on intentions to support and vote for smoking ban policies. There is strong support for restricting smoking in most public areas and around vulnerable groups (children and pregnant women). Moreover, this support for restricting smoking is strongly associated with advocacy intentions. Implications for smoking bans can reduce secondhand smoke exposure, smoking prevalence, and death and disease related to secondhand exposure. In Chapter 4, emotions had no effect on any of the smoking-related advocacy intentions. However, it is possible that there could be an indirect effect of emotions on smoking-related advocacy intentions through perceptions or self-efficacy. Understanding what emotions, if any, can increase smoking-related advocacy intentions, either directly or indirectly, remains unknown and thus further research is needed.

Overall emotions are helpful in processing information and have been found to have differential effects in smoking-related outcomes. Fear, anger, sadness, and disgust are common emotions elicited from anti-tobacco campaigns and have the ability to increase intentions to not smoke, increase ad campaign effectiveness, and increase perceptions of risk and responsibility. Continued research is needed in this field of emotions and decision-making, especially around health behaviors such as smoking.

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