

The Pennsylvania State University

The Graduate School

College of Communications

**THE IMPACT OF DISGUST ON THREAT APPEALS: ENHANCEMENT OR
ATTENUATION OF PERSUASION?**

A Dissertation in

Mass Communications

by

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Submitted in Partial Fulfillment

of the Requirements

for the Degree of

Doctor of Philosophy

December 2017

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ABSTRACT

Threatening messages designed to influence individuals' attitudes and behaviors often arouse disgust as well as fear. Although the impact of fear has been examined by researchers over the past several decades, it's unclear whether the co-activation of disgust and fear would enhance or impair persuasion. This study examined this question through an online experiment with a 2 (disgust vs. no-disgust) \times 2 (relevant vs. irrelevant) plus control between subject design. Participants (N = 306) were randomly assigned to read one of the five threatening messages about human papillomavirus (HPV) and reported their emotional reactions, attitudes and behavioral intentions regarding the issue. The extent to which they memorize the message content was also assessed.

Results showed that self-reported disgust interacted with fear and they jointly impacted message retention. Specifically, when significant amount of disgust was activated, increase in fear resulted in worse memory of the message. On the contrary, if individuals did not experience much disgust, they tended to memory the message better. Also, the data revealed a consistent pattern that self-reported disgust impaired persuasion through reactance. When disgust was experienced during and after exposure to the threatening message, reactance was activated, which in turn resulted in resistance to attitude and behavior change.

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Acknowledgments

Dr. Mary Beth Oliver, I am deeply indebted to you for your continuous encouragement and support. As my mentor, you not only have guided me through this journey since I joined the program at Penn State, but also set the example of being an excellent researcher and teacher, and a warm and caring human being.

Dr. James Dillard, words cannot express my gratitude and appreciation to you for your guidance and advice on my research, career, and life. Working with you is one of the best experiences I've had at Penn State. Thanks for nurturing me.

Dr. Fuyuan Shen, I'm so grateful to you for your kind help and advice on my study, my dissertation, and a variety of other aspects of my life at Penn State.

Dr. Shyam Sundar, it is my great privilege to have you as a committee member and a professor. Your suggestions have made this project much stronger than it was. Your classes are among the best ones I've ever had.

My gratitude to Dr. Rick Busselle. You have been instrumental in several aspects of my life. The time spent with you and your family at Pullman will always be my sweet memories.

Dr. Changmin Yan, thank you for making my life trajectory less tortuous.

Dr. Matt McAllister, your support means so much to me and to my family. Thank you so much.

Special thanks to Dr. Lijiang Shen for your advice on my dissertation and research.

Thanks to Ruoxu Wang for helping me create the experimental stimuli for my dissertation. And my gratitude to my other colleagues and friends for your insightful suggestions and comments on this project.

To my wife Fan: I will never be able to repay you for what you have done for me. Thank you for your unconditional love and support.

To my daughter Catherine and son Derek: thank you for continuously inspiring me and motivating me to be a better person.

To my parents, my mother-in-law, and my younger brother's family: your support in every possible way makes it possible for me to stand where I am. After years' searching for the meaning of my life, I start to believe that having you all and my own family in my life is part of that ultimate meaning.

To my grandmother (paternal) Biyun Mo and my grandfather (maternal) Jianfeng Yu: I know you must be so proud of me if you were here with me now.

To my friends: this journey would have been impossible without your friendship and support.

Chapter 1

Introduction

Threat appeals have generated a great deal of interest among researchers over the past sixty years. A number of theories have been proposed to account for the persuasive effects of threatening messages. It is understandable that many theoretical accounts primarily focus on the emotional response of fear elicited by message exposure. However, given these messages often elicit emotions other than fear (e.g., Dabbs & Leventhal, 1966; Dillard, Plotnick, Godbold, Freimuth, & Edgar, 1996), it is surprising that the influence of other emotions has rarely been examined.

Among the different emotions, disgust is of particular interest. In both practice and academic research, content that elicits disgust is often incorporated into threatening messages in an effort to enhance persuasion (e.g., Leshner Bolls, & Thomas, 2009; Leshner, Bolls, & Wise, 2011; Morales, Wu, & Fitzsimons, 2012). What is often ignored is the fact that this type of content may exert a unique influence on persuasion through elicitation of disgust. Indeed, recent studies suggest that the persuasive outcomes can be affected by both fear and disgust induced by the message (e.g., Leshner Bolls, & Thomas, 2009; Leshner, Bolls, & Wise, 2011; Jónsdóttir, Holm, Poltavski, & Vogeltanz-Holm, 2014; Morales, Wu, & Fitzsimons, 2012). Whether the activation of both emotions would enhance or disrupt persuasion is unclear. Some researchers have reported that activation of disgust through threat-appeal messages facilitates persuasion (e.g., Morales et al., 2012), while other studies have found that elicitation of disgust during exposure to threatening messages attenuates persuasion (e.g., Leshner et al., 2009, 2011). It is worth noting that one of these two lines of research did not measure persuasion directly (e.g., Leshner et al., 2009, 2011). Instead, the impact on persuasion was inferred from a measure of the

memory of the message. In other words, the suggested detrimental effect of disgust on persuasion was not demonstrated directly. Thus, further testing is warranted to examine if co-activation of disgust and fear will disrupt persuasion.

A second reason to conduct research in this areas is that there are several other theoretical perspectives that could potentially enlighten our understanding of disgust's persuasive role. However, these perspectives have yet to be tested. For instance, argumentation theory (Eemeren, Grootendorst, & Henkemans, 1996) can shed light on how disgust might affect persuasion when being elicited by a threatening message. The predictions based on it are similar to the ones from some existing research (Morales et al., 2012), but the theoretical mechanism is different. By testing different theoretical perspectives, we not only can have a better sense of whether disgust facilitates persuasion or not, but also understand more of the underlying mechanisms.

Third, research on the impact of disgust in persuasion is warranted given the fact that previous research has ignored a factor that could potentially influence the persuasive outcomes – whether the disgust components are relevant to the message topic or not. The disgust components in health-related PSAs are not likely to be irrelevant to the message given they are often used to bolster the effects of message (e.g., Morales et al., 2012). However, in the current rich media environment, when individuals get online and browse a website, they are often simultaneously exposed to both the featured information (e.g., a health topic on a health promotion website) and some other information shown in sidebar area or in pop-up/pop-under windows (e.g., a different health issue). For example, if an individual is browsing the information about a new virus and its impact on human health on a health promotion website (e.g., Webmd.com), she/he may also notice other health information that is irrelevant to this new virus in the sidebar area or in a pop-under window (e.g., consequences of excessive intake of

alcohol). The text/graphic contents in both the featured information (e.g., describing or depicting a man vomiting as a consequence of the infection of the virus) and those irrelevant information (e.g., texts or an image featuring inflamed rosacea on a woman's face) could potentially elicit disgust. An intriguing issue is whether the experience of disgust aroused by irrelevant information would influence the persuasive outcome of the featured message. Different theoretical perspectives seem to suggest different possibilities. To assess the potential influence of relevance regarding disgust's role in persuasion would be of significant theoretical as well as practical implications.

In the following sections, I will first explain the concept of threat appeals and why we should study the potential influence of disgust that is aroused by threat-appeal messages. Then, the idea of disgust as a discrete emotion will be introduced, followed by a discussion of existing studies about disgust's impact in persuasion. After that, I will review different theoretical positions for understanding the role of disgust in persuasion. Hypotheses and research questions will be generated based on the discussion of these different theoretical perspectives. I will also provide detailed information about the method before I report the findings from data analyses. Finally, I will discuss these findings and what we can learn from this study.

Chapter 2

Literature Review

Threat Appeals and Disgust

Threatening messages that intend to arouse fear are widely used in persuasion. Labeled as “threat appeals,” these messages are designed to persuade individuals to comply with recommendations by emphasizing the impending noxious consequences of noncompliance (Hale & Dillard, 1994). Following Rogers (1975), most researchers agree that a threat-appeal message normally contains two ordered components. The threat component consists of (a) a *severity* subcomponent that emphasizes the negative consequences associated with noncompliance and (b) the message recipients’ *susceptibility* to these negative consequences (Rogers, 1975). The action/recommendation component contains information regarding (c) *response efficacy* – the perceived effectiveness of compliance to recommendations and (d) *self-efficacy* – the belief of one’s ability to perform the recommendations (Rogers, 1983). The threat component precedes the action component in most of the threat appeals.

A series of studies on fear/threat appeals by Hovland and colleagues (e.g., Hovland, Janis, & Kelly, 1953) have been recognized as start of social scientific research on how fear influences persuasion (Mongeau, 2013). Since 1953, many researchers have examined the persuasive effects of threat appeals. Over sixty decades of research has generated a number of theories/models and important empirical findings. This entire body of research is often referred to as fear-appeal research, highlighting the central role of fear as the emotional response to the message. However, additional research (e.g., Dabbs & Leventhal, 1966; Dillard et al., 1996) suggests that fear is often not the only emotion elicited by a threatening message. One such additional emotion is disgust (e.g., Leshner et al., 2011; Nabi, 1998).

Disgust has been recognized as one of the basic and universal emotions (e.g., Chapman & Anderson, 2012; Niedenthal, Krauth-Gruber, & Ric, 2006). According to Kant (Menninghaus, 2003), disgust is a defense mechanism against three potential threats to human well-being: bad smell and taste; the violation of moral, hygienic, and sexual appropriateness; and drowning in mental pleasure (i.e., disgust can prevent people from indulging into insatiable desire for mental pleasure). Kant's conceptualization of disgust lays the foundation for modern examinations of disgust. Started from Darwin (1872), modern scientific investigations of disgust often recognize the origin of disgust as oral rejection. Darwin (1872) defined disgust as "something offensive to the taste" (p. 269). He considered disgust as a revolting reaction to food of unusual appearance, odor, or nature. Similar conceptualizations were adopted by other theorists (e.g., Angyal, 1941; Tomkins, 1963). For instance, Rozin and colleagues (e.g., Rozin & Fallon, 1987; Rozin, Lowery, & Ebert, 1994) defined disgust as a revulsion at the prospect of (oral) incorporation of an offensive object. Other researchers might not agree with Darwin (1872) that disgust is originated from food rejection, but they also tend to believe that disgust is rooted in oral rejection. For instance, Oaten and colleagues (2009) posit that disgust is a defense mechanism against contagious pathogens.

Disgust can be elicited by other objects or behaviors as well. Researchers (e.g., Haidt, McCauley, & Rozin, 1994) have identified a variety of disgust elicitors such as food, body products, animals, poor hygiene, socially disapproved sexuality, damages to the human body (gore and deformity), death, and behaviors violating morality. In an effort to categorize these different elicitors of disgust, researchers have proposed different ways to group these elicitors. Although no consensus has been obtained on the categorization of disgust, it is generally agreed that food and pathogens can arouse primitive disgust – often referred to as core disgust (e.g.,

Haidt et al., 1994). Violations to social norms such as moral breach and inappropriate sexual behaviors/relationships elicit social/moral disgust (e.g., Tybur, Lieberman, Kurzban, & Descioli, 2009).

Threatening messages often contain content that many people find revolting. The prevalence of imbedding revolting content in threat appeals is manifested in many health campaign messages. For example, as recognized by Leshner and colleagues (2011), anti-smoking campaigns usually include images with disgust elicitors: animals (e.g., insects), body products (e.g., urine), body damages (e.g., surgical procedures), and hygiene threats (e.g., germs). One example is the 2012 tobacco education campaign of *Tips From Former Smokers* by the Centers for Disease Control and Prevention (CDC). The campaign includes examples of former smokers living with the ravages of tobacco use – the consequences of throat cancer. The graphic depiction of a hole in a character's neck is not only threatening, but also disgusting. Other health campaigns often include content that is likely to be perceived as disgusting with vivid portrayals of disease symptoms or other damages to the body. For example, a disfigured face of a drunk-driver after an accident in the Canadian responsible driving campaign of *Don't Be That Guy* is perceived as not only gruesome, but also quite disturbing (Reid, 2013).

In academic studies, it is also a common practice to incorporate disgusting content in threatening messages. Since early days of research, researchers have frequently relied on revolting content as part of fear manipulations. For example, to elicit relatively high levels of fear, Janis and Feshbach (1953) created threatening messages that displayed ugly and decayed teeth, and sore and inflamed gums – content that is likely to arouse disgust. Berkowitz and Cottingham (1960) put gory film sequences into vivid threat material to arouse intense fear (Janis, 1967, p.200). In the studies conducted by Leventhal and colleagues (e.g., Leventhal &

Watts, 1966), gory images such as surgical procedures of lung cancer operations were often used as part of the fear manipulation. In the strong-fear condition of a study by Leventhal and Watts (1966), participants were shown a color sequence of film depicting a surgery with close-ups of the opening of the chest and removal of the lung. Similarly, to create a high-fear condition, Witte (1994) also relied on images that were likely to arouse disgust when she exposed participants to photographs of late-stage AIDS victims and vivid language describing the symptoms such as oozing sores all over the body.

Although the incorporation of content that arouses disgust is common in designing threatening messages, the question of whether this emotion has a unique contribution to persuasion is often ignored (Nabi, 2002). It was not until in recent years that researchers started to examine the influence of disgust in human communication (Nabi, 1998, 2002). These endeavors have generated a mixed picture in terms of the persuasive role that disgust plays in threat appeals. One line of research (Leshner et al., 2009, 2011) suggested that elicitation of both fear and disgust would impair persuasion, whereas others (Morales et al., 2012) reported that when disgust is aroused in addition to fear, the threatening message would be more effective than otherwise. Jónsdóttir and colleagues (2014) also found that disgust elicited by threatening antismoking PSAs could enhance persuasion. Note that Leshner and colleagues (2009, 2011) did not measure persuasion directly. Instead, they inferred from memory measures and psychophysiological measures that attitude and behavioral intention were less affected by threatening messages that elicit both fear and disgust, compared to messages that arouse fear only. Obviously, to further test the persuasive role of disgust in threatening messages, we need to measure both memory and persuasion to see if the elicitation of disgust in threat appeals would impair both of these variables.

In addition to further testing predictions from these two lines of research, it is helpful to approach this issue with the guidance of other theoretical perspectives. As we will discuss in the following sections, different theoretical perspectives often generate different predictions regarding the persuasive impact of disgust. More importantly, even if some of them predict the same outcomes with regard to the general persuasive effects of disgust, they tend to attribute these effects to different mechanisms. By comparing and contrasting these different theoretical perspectives, we can test different predictions generated by these perspectives. In the following sections, I will focus on four theoretical perspectives and discuss how they predict different or similar effects through different mechanisms.

Argumentation Theory and Disgust's Role in Persuasion

Argumentation theory is a general term to describe the interdisciplinary efforts to study how to draw a conclusion by rational reasoning (Eemeren et al., 1996). Argumentation theorists perceive argumentation as an activity of reason with the goal of persuading the other party to accept a controversial standpoint. A constellation of propositions are provided to support the advocated standpoint (Eemeren et al., 1996). In his model of argumentation, Toulmin (1969) conceptualized an argument as a multi-level structure with a central *claim* supported by a number of different components including *datum*, *warrant*, *backing*, *rebuttal*, and *qualifier*. A *Datum* is some evidence that can bolster a *claim*. It is connected to the *claim* by a *warrant* – the principle or provision that legitimizes the *claim* by showing that the *datum* is relevant. For example, if we have a *claim* of *Jon is a U.S. citizen* with the *datum* that *Jon was born in Hawaii*, a *warrant* could be *A man born in Hawaii will be a U.S. citizen*. The *claim*, *datum*, and *warrant* are essential elements for an argument.

The other three components often function as supporting materials for the *claim*. The *backing* is the proposition that can be used to support a *warrant*, if the *warrant* is under questioning. As for the *rebuttal*, it is the counter-argument to a *claim*. Facing a *rebuttal*, the *claim* can be held by adding a *qualifier* that specifies the boundaries of the original *claim*. In this sense, Perelman (1959, p. 18) contends that an argument “consists in estimating an action, or any event, or a rule, or whatever it may be, in terms of its favourable or unfavourable consequences.”

From this perspective, persuasive messages can be understood in the structure of a claim with supporting materials. The *rebuttal* can also be understood as a type of supporting evidence because it is often incorporated into the argument to help delineate the boundary of the claim. In persuasion research, incorporation of a *rebuttal* in a message has been a strategy to improve persuasion (one-sided vs. two sided message, and inoculation theory). As a persuasive message, a threat appeal often contains a claim – a recommendation or advocated position, as well as a set of carefully-crafted and structured evidence that supports the recommendation. In the widely-accepted four-component structure proposed by Rogers (1975, 1983), the claim – the recommendation – is embedded in the efficacy component. The threat component comprises information that is intended to highlight the outcomes of non-compliance – evidence that undesirable consequences can befall message recipients. For example, as aforementioned, disgust-eliciting content is often embedded in threat appeals as evidence of the severity of the consequences due to non-compliance. In the efficacy component, supporting information is also included to suggest that the recommendation does work and message receivers should be able to perform the recommended act.

Although argumentation theorists do not typically discuss message recipients’ motivation and ability to engage in an argument, argumentation theory implies that message receivers must

have certain levels of motivation and ability to evaluate an argument. For instance, Walton (1996, p. 75) asserts that argumentation can be understood as “a species of practical reasoning where a contemplated policy or course of action is positively supported by citing the good consequences of it. In the negative form, a contemplated action is rejected on the grounds that it will have bad consequences.”

Motivation and ability to carefully evaluate an argument have been explicitly discussed and explained in a number of different persuasion theories (e.g., Fishbein & Ajzen, 1975; Petty & Cacioppo, 1986). These theoretical accounts recognize the idea that message receivers should inspect the message, if motivated. For instance, the elaboration likelihood model (ELM, Petty & Cacioppo, 1986) holds that motivated individuals should carefully evaluate the merits of the argument presented in the message. A similar position can be inferred from the theory of reasoned action (TRA, Fishbein & Ajzen, 1975) and McGuire’s (1960) syllogistic model. Likewise, Morley’s (1987) subject message construct theory maintains that message receivers actively appraise messages based on three criteria: the importance, novelty, and plausibility of the information presented in persuasive messages. Morley (1987) argues that acceptance of the advocated position is a joint function of these three criteria.

Argumentation theory not only prescribes the general structure of an argument, but also dictates some basic rules for crafting an argument. One such rule is that supporting materials in an argument should be relevant to the topic/issue. In argumentation studies, irrelevance has long been categorized as an argumentation fallacy that one should avoid (Copi, Cohen, 1994). Johnson and Blair (2006) argue that premises of an argument have to be acceptable, relevant, and sufficient. Obviously, embedding issue/topic-irrelevant evidence into an argument is not

expected to provide much of a support to the claim. Only relevant evidence can strengthen the claim.

Thus, in the context of threat appeals, when issue-relevant disgust-eliciting content is used as evidence of the severity of the hazard, individuals should be expected to perceive the argument as more compelling, compared to the situation where the same content is not included. The disgust-eliciting content as supporting evidence of the argument would increase the perceived severity of the threat among message recipients. Everything else being equal, the increase of perceived severity of the hazard should strengthen the claim and thus make the message more persuasive.

When issue-irrelevant information is embedded into a threatening message, however, persuasive outcomes should not be affected. As aforementioned, message recipients tend to evaluate the extent to which the claim is supported by the evidence. If what is included is deemed to be irrelevant to the current message topic, it might affect message receivers' perception of the quality of argument structure, but the level of perceived severity of the featured issue is not expected to be affected. No effects are anticipated either, at least not via the increase of perceived severity. Thus, the following predictions are advance.

H1a: Threat appeals with issue-relevant content that elicits disgust will be more persuasive than any of the following four types of messages: a threatening message with issue-irrelevant content that elicits disgust, a threatening message with issue-relevant non-disgust content, a threatening message with issue-irrelevant non-disgust content, and an original threatening message.

H1b: The above predicted effects will be mediated through the perceived severity of the threat.

Functional Perspective of Emotion Theories and Disgust's Role in Persuasion

To understand how disgust is an emotion different from fear and how it would contribute uniquely to attitude and behavioral change, it is useful to also consider a functionalist approach to emotion. Functional emotion theories (e.g., Darwin 1872/1965; Izard, 1977; Lazarus, 1991; Plutchik, 1980; Tomkins, 1963) maintain that emotions serve adaptive functions for the purpose of social and physical survival. From the evolutionary perspective, functional emotion theories hold that emotions should be examined in the individual-environment relationship. Human beings experience emotions because environmental stimuli either facilitate or obstruct individuals' personal goals. Emotions help individuals to mobilize cognitive and physical resources to pursue adaptive goals. Thus, as a psychological construct, emotion often consists of the cognitive appraisal of a situation, the physiological component of arousal, the motor expression, a motivational component, and a subjective feeling state (Nabi, 2002).

According to this theoretical perspective, although both fear and disgust are considered as protection mechanisms that motivate individuals to distance themselves from the threat (Lazarus, 1991, Rozin et al., 1993), they differ in a number of ways. First, fear is often associated with facial expressions such as straight and somewhat raised eyebrows, horizontal wrinkles on the forehead, widely opened eyes, opened mouth, and drawn-back lips (Izard, 1977). Disgust, on the other hand, manifests itself as an expression including wrinkling of the nose, narrowing of the nares, and curling upper lip (e.g., Rozin, Lowery, & Ebert, 1994). Also, both fear and disgust can elicit physiological reactions such as increased heart rate and heightened muscle tension, though the feeling of nausea is uniquely associated with disgust. The subjective feeling of revulsion is also a distinctive characteristic of disgust that helps to define it as a unique emotion different from fear (Lazarus, 1991).

A major difference between fear and disgust that can potentially account for their different roles in persuasion is their action tendencies. As suggested by researchers (Lang, Bradley, & Cuthbert, 1997; Rosen & Schulkin, 1998), fear is associated with multiple action tendencies. When threats are perceived but not imminent, individuals often freeze up – a reaction similar to a deer in headlights. During this stage, individuals are hyper-alert to the environment. The emotion of fear helps them mobilize resources to prepare for further adaptive behaviors. When the danger becomes imminent, the freezing-type behaviors turn into flight response. Individuals should attempt to escape from the threat. Unlike fear, disgust encourages only one type of response: immediately distancing oneself away from the danger without hesitation (Lazarus, 1991; Smith & Ellsworth, 1985). Based on this premise, Morales et al. (2012) conducted a series of experimental studies across different topics with different message formats (e.g., texts with images and text-only). The results suggest that messages that aroused both fear and disgust are more persuasive than those that only elicit fear. This effect was found to be mediated by the immediacy of action requirements associated with disgust.

It is worth noting that although this line of research (Morales & Fitzsimons, 2007; Morales et al., 2012) did not investigate the potential influence of issue-relevance, it did demonstrate that issue-irrelevance might not interact in persuasion. Specifically, the last two experiments in Morales et al. (2012) used issue-irrelevant disgust-eliciting images as primes before exposure to the persuasive messages. These issue-irrelevant contents were as effective as issue-relevant ones used in the first two experiments – both enhanced persuasive outcomes by motivating participants to take actions immediately. This finding seems to be at odds with the appraisal theory of emotion (Lazarus, 1991).

According to Lazarus (1991), emotions should be understood in the context of human-environment relationship. Any changes in the environment that are considered to be relevant to one's goals would be appraised by the individual. In the first set of appraisals, individuals will assess to what extent the situation is relevant to their personal goals, and if so, whether it is harmful or beneficial. They will also appraise the nature of the corresponding goal. For instance, a criticism about an individual's behavior might be interpreted by the person as relevant to his goal of ego identity. It could be considered as harmful to the ego identity. Therefore, this situation passed the first stage of appraisal – primary appraisal (Lazarus, 1991). The next stage of appraisal – secondary appraisal – concerns coping strategies (Lazarus, 1991). Individuals evaluate the accountability/responsibility of the situation, the options to cope with it, and the potential outcomes if the coping strategy is taken. In the example of being criticized by others, the person might blame the critic because he believes the criticism is groundless. Further, he could choose to swallow it if this would work favorably for him, or fight back if he expects better outcomes by adopting this strategy.

When encountering issue-irrelevant information in a threat appeal, message receivers might still go through these different appraisal stages because the disgust elicitors might nonetheless be perceived as threats to one's well-being, even if these elicitors are not related to the message topic. Individuals could be motivated to appraise and address it as they do for the issue-relevant disgust elicitors. However, their appraisals for this issue-irrelevant content should not be expected to go across the boundary of this specific set of appraisals. Thus, we should not anticipate this set of appraisals would affect individuals' reactions to the featured object – the message topic. In other words, when issue-irrelevant content is included in a threatening message, there are two different processes of appraisals going on – one being the appraisals of

the message topic, and the other the appraisals of the irrelevant content. The elicitation of disgust through some issue-irrelevant content should not affect recipients' reaction to the threatening message because the urge to reject the irrelevant content is unlikely to be transferred to the hazard highlighted in the threatening message. Therefore, message recipients should react to the message with issue-irrelevant disgust elicitors just like they do to the threatening message that only arouses fear.

What does this perspective imply about non-disgusting content that is presented simultaneously with a threatening message, be it relevant or not? For instance, when additional supporting evidence of the threat that does not elicit disgust is incorporated into a threat appeal, would the message be more persuasive than otherwise? Or, if an individual is reading a threatening message on a health promotion website, and the headline and a graphic thumbnail of a different health topic on the sidebar area grasps his attention, would the irrelevant information that does not elicit disgust affect the persuasive outcomes of the featured message? Given that the persuasion-enhancement effect of disgust hinges upon its unique motivational impact on message recipients, and these types of messages do not elicit disgust, they should be less persuasive than the threat appeals with issue-relevant disgust elicitors included. In addition, they are likely to be equally effective as the ones with issue-irrelevant non-disgust elicitors. The above reasoning leads to the following predictions.

H2: Threat appeals with issue-relevant content that elicits disgust will be more persuasive than any one of the following four types of message: a threatening message with issue-irrelevant content that elicits disgust, a threatening message with issue-relevant non-disgust content, a threatening message with issue-irrelevant non-disgust content, and the original threatening message.

This perspective would argue that action tendency of disgust mediates the above proposed effects. Although this makes theoretical sense, it faces a practical challenge – action tendency is hard to measure independent of the emotion. For instance, the action tendency measure in some studies (e.g., Morales et al., 2012) is actually assessing attitudes toward the issue rather than the motivation of engaging in certain behaviors during the appraisal process. Therefore, this prediction regarding the mediating role of action tendency was not tested in this study.

Cognitive Overload Position on Disgust's Role in Persuasion

Guided by Lang's (2006) Limited Capacity Model of Motivated Media Message Processing (LC4MP), research by Leshner et al. (2009, 2011) suggests that elicitation of disgust in addition to fear by threatening messages can be detrimental to persuasion. With the assumption that human beings have limited cognitive capacity (Basil, 1994; Schneider, Dumais, & Shiffrin, 1984), the LC4MP posits that when being exposed to media messages, individuals allocate their limited cognitive resources into three sub-processes: encoding, storage, and retrieval. Resource allocation can be affected by the activation of two motivational systems – the appetitive and aversive systems. Although both systems are often co-activated by environmental stimuli, one of them might be more active than the other, depending on the level of arousal as a response to the changes in the environment. The appetitive system is considered to be more active than the aversive system when the arousal level is low to moderate - a result of the identification of negative environmental stimuli. When this happens, individuals are predicted to allocate more resources to the process of encoding. However, as the threat is becoming imminent, the more unpleasant one feels, and the level of arousal continues to increase, which leads to more cognitive resources being allocated to processing the information. This increasing

tendency will stop when arousal increases to the point where the individual could not tolerate the averseness any more and direct resources to retrieval (e.g., figuring out what to do based on available information regarding the environment and the threat) and storage (e.g., remembering the nature of the danger and successful strategy to avoid it in the future).

Drawn from the LC4MP, Leshner and colleagues (2009, 2011) argue that when both fear and disgust are elicited by a threatening message, the aversive motivational system will be activated at a higher level than when fear is the only emotional response to the message. Thus, fewer cognitive resources are allocated to encoding, compared to the situation where only fear is aroused. Worse encoding, in turn, results in worse information storage, which is manifested as the difference in memory of the information: those who are exposed to fear-eliciting message should remember the message better than those who have viewed one that contains both fear and disgust-eliciting materials. Results from several experimental studies provide support for this argument. Elicitation of both fear and disgust resulted in less heart rate deceleration and worse information recognition than when only fear was aroused (e.g., Leshner et al., 2011).

According to this line of reasoning, threat appeals with content that elicits disgust are anticipated to be retained at a lower level than the original message, regardless of the relevance of the content to the message topic/issue, due to the increased negativity and heightened level of arousal in the former. Does this line of research enable us to predict any difference between a threatening message and the same message with some additional non-disgusting elements? If the latter does not elicit any additional negatively valenced emotion in addition to disgust, it is hard to see any reason to expect an increase in the unpleasantness and the emotional arousal level in terms of the message receivers' response to the message, compared to the reaction to the original message without any additional materials incorporated. Thus, the following effects are predicted:

H3a: Threat appeals with content that elicits disgust (whether it is related to the message topic or not) will be retained less well than any one of the following three types of messages: a threatening message with irrelevant non-disgust content, a threatening message with relevant non-disgust content, and the original threatening message.

If incorporation of disgust-elicitors in threat appeals would disrupt memory, does it also compromise persuasion? Although this line of research has not examined persuasive outcomes directly, it assumes that retention is positively associated with persuasion, which leads to the conclusion that the worse an individual can remember the message content, the less persuasive the message is. In some studies, researchers contend that disgust not only disrupts memory, but also undermines persuasion (e.g., Leshner et al., 2011). Specifically, individuals who feel both fearful and disgusted in response to the message will not only remember less of the message content, but will also be less likely to adopt the recommendations in the message. Thus, threat appeals with content that elicits disgust are anticipated to be less persuasive than the ones without such content, regardless of the relevance of the content to the message topic/issue, because memory of the message content should be worse in the former. The design of the current study enabled us to test these following predictions based on the cognitive overload position:

H3b: Threat appeals with content that elicits disgust (whether it is related to the message topic or not) will be less persuasive than any one of the following three messages: a threatening message with irrelevant non-disgust content, a threatening message with relevant non-disgust content, and the original threatening message.

Although this line of research implies that memory mediates the relationship between message exposure and persuasion, this mediating role of retention is not supported by empirical data (see Greenwald, 1968). In other words, memory is not considered as a sufficient condition

for persuasion. Further, in practice, retention tests are often conducted after the assessment of attitudes/opinions. This temporal order makes it problematic to regard memory as the mediator between message exposure and persuasion. Therefore, this study did not treat memory as a mediator between message conditions and persuasive outcomes.

Reactance Position on Disgust's Role in Persuasion

Another theoretical position that might help us understand the persuasive role of disgust in threat appeals is the theory of psychological reactance (Brehm, 1966). The theory supposes that individuals have the subjective perception that they possess the freedom to engage in a set of behaviors at present or sometime in the future under reasonable constraint. Rather than an abstract concept, the freedom in the theory is conceptualized as the possibility to exercise a set of concrete behaviors (Brehm & Brehm, 1981). This behavioral freedom is important to individuals' well-being since it helps them to satisfy their needs and avoid potential harm and pain. According to this theory, when a specific freedom is eliminated or threatened with elimination, individuals will be motivated to restore that freedom. This motivational state is named as psychological reactance by Brehm (1966). It is conceptualized as a continuum. Three factors are positively associated with the magnitude of reactance: a) the perceived importance of the free behaviors; b) the proportion of freedom that is threatened; c) the magnitude of the threat. Thus, with the increase in the levels of these three factors, the level of psychological reactance escalates.

Activation of psychological reactance is expected to result in an effort to regain freedom. Individuals might choose to exercise their threatened behavioral freedom by engaging in that behavior anyway either by themselves or by some external agent on behalf of themselves. For example, if an individual's cell phone is robbed by someone else, to grab it back or to have a

police officer to get it back are the ways to re-establish the freedom of possessing and using one's own cell phone. The freedom can also be regained indirectly. An individual can restore the threatened or eliminated freedom if she/he observes other people under similar conditions regain the freedom. The restoration of freedoms is believed to be able to reduce psychological reactance. Under circumstances where individuals realize that the threat is insurmountable and it is impossible to re-establish the freedom through any possible means, they are inclined to either give up that freedom or exercise a different freedom, which can also help to decrease psychological reactance (Brehm & Brehm, 1981).

Perceived persuasive intention is considered as a threat to behavioral freedoms and has been found to arouse psychological reactance (Brehm, 1966; Worchel & Brehm, 1970). Threat-appeal messages are often presented to individuals with explicit persuasive intent. This seems to suggest that psychological reactance is unavoidable when individuals are exposed to threat appeals. However, as aforementioned, activation of reactance also depends on other factors such as the perceived importance of the free behaviors and the proportion of freedom that is threatened (Brehm, 1966). Therefore, it is unclear whether psychological reactance will be activated by the threat appeal message in this study.

RQ1: Will reactance be activated by any version of the threat appeal messages in the current study?

If reactance is identified in all four conditions, it would indicate that a) the threatened free behaviors are perceived to be important to the participants; and b) the proportion of the freedom that is threatened is substantial. Under that circumstance, we can generate predictions based on psychological reactance theory. Additional content that is irrelevant to the message topic is not very likely to be interpreted as part of the threat to the particular free behavior that is under

threat. Therefore, threat appeals with additional issue-irrelevant content embedded are expected to arouse a similar amount of psychological reactance as does the original messages.

Consequently, no difference is predicted in persuasive outcomes between these different types of messages.

However, when both fear and issue-relevant disgust are aroused, we should anticipate a heightened level of reactance among message recipients than among the recipients of the original message. Incorporating information that is not only perceived as issue-relevant but that also elicits disgust, the threatening message can be considered as a threat greater in magnitude than otherwise. A higher level of reactance may be aroused, which would lead to behaviors that are intended to reestablish the freedom. As discussed earlier, none of these attempts at restoring freedom manifest as compliance with the recommendation. Indeed, activation of reactance typically results in less message acceptance among recipients (e.g., Benoit, 1998; McGrane, Toth, & Alley, 1990). Thus, elicitation of both fear and disgust can potentially disrupt persuasion because message receivers are more likely to reject the recommendations and engage in the forbidden act, compared to the situation where only fear is aroused. Therefore, the following predictions are hypothesized:

H4a: If psychological reactance is aroused, threat appeals with issue-relevant content that elicits disgust should be less persuasive than the ones without such content.

H4b: The above predicted effects will be mediated through psychological reactance.

A summary of the predictions based on different theoretical perspectives is shown in Table 1 on the next page.

Table 1. *Summary of Predictions – Persuasive Effects of the Five Conditions by Different Theoretical Perspectives*

		Conditions					Mediator
Theoretical Perspectives		Fear + relevant disgust	Fear + irrelevant disgust	Fear + relevant non-disgust	Fear + irrelevant non-disgust	Fear only	
	Argumentation Theory	High	Moderate	Moderate	Moderate	Moderate	Perceived Severity
	Emotion Theories	High	Moderate	Moderate	Moderate	Moderate	
	Cognitive Overload Position	Low	Low	Moderate	Moderate	Moderate	
	Reactance Theory*	Low	Moderate	Moderate	Moderate	Moderate	Reactance

Note. All predictions are within-row comparisons. No within-column comparison is proposed.

*The predicted effects in this row are based on the premise that psychological reactance is activated in all of these five conditions.

Chapter 3

Methodology

This study examined the influence of disgust and relevance in threatening messages. A 2 (disgust: disgust vs. non-disgust) \times 2 (relevance: relevant vs. irrelevant) + control (fear only) between-subject experiment was conducted to investigate the questions of interest.

Message Topic and Messages

A threat appeal message was produced as the base message for the five conditions. The message focuses on the topic of human papillomavirus (HPV) in an effort to raise awareness of HPV and to increase acceptance of the HPV vaccines. As the most common sexually transmitted infection in the United States (CDC., and Weinstock, Berman, & Cates, 2004), HPV infection can lead to a number of different health issues including cervical cancer (Bosch, Lorincz, Munoz, Meijer, & Shah, 2002; Walboomers et al., 1999). Research has found that the HPV vaccination rate among young adult women is low (Conroy et al., 2009; Jain, Euler, Shefer, Lu, Yankey, & Markowitz, 2009; Williams et al., 2014). There is some evidence that young adult women have misconceptions regarding HPV and HPV vaccines and thus might underestimate the true risk of HPV (Dillard & Spear, 2010). The significance of this issue and the potential room for message designers to persuade young adult women to receive HPV vaccines make it a good topic for this study.

The generic base message consisted of a series of slides with both images and texts centering around HPV and HPV vaccines. The message was divided into four different sections. The first part focused on the causes and symptoms of HPV infection, followed by the second section that explained the risks of it. The third part stressed the effectiveness of HPV vaccines to prevent infection. The final section of the message provided information regarding the cost of the

vaccines and different programs available for young women to get HPV vaccines for free. Each section comprised of three to four slides.

Pop-up windows with images and simple texts were used to manipulate disgust and relevance in the four experimental conditions. A pop-up window that took up about three thirds of the full screen size window was presented right after the first two slides in the first section of the message. To choose images for the four experimental conditions, a pretest was conducted by sampling participants from the same population of the main study. A total of 16 images (4 for each condition) selected by the researcher was shown to participants. Based on participants' emotional responses to and their ratings of perceived relevance of each picture, four images were selected for these conditions. Descriptive statistics of participants' ratings of disgust and relevance are shown in the appendices. In the issue-relevant disgust condition, a close-up image featuring warts in a person's mouth was embedded into the pop-up window with the texts "Stay away from HPV. Avoid getting warts." Participants in the issue-irrelevant disgust condition saw a photo of a dead animal's leg sticking out of a toilet with a heading "Get a plumber. Don't do it yourself!" For the issue-relevant non-disgust condition, the pop-up window displayed a picture featuring a doctor communicating with a patient with the side texts "Check out the HPV video series. Don't miss out!" In the issue-irrelevant non-disgust condition, an image of a recycling bin containing some plastic bottles was displayed with bolded texts on the side read "Recycle your plastic bottles. Don't toss around." To make it consistent across conditions, the fear-only condition also included a pop-up window but only showed a blue rectangular area with the white text readings "Advertise Here" in the center. Given that other pop-up windows all included some texts aside from the image, bolded texts of "Put your ads here. Get your message noticed!" were put to the right hand side of the image in the fear only pop-up window. All the images were

similar in size. Identical size and font were used for all the texts in all pop-up windows. These five pop-up windows are shown in the appendices.

Participants

Participants were recruited by Qualtrics as part of a national opt-in online survey panel. Questions within each block were randomized and attention filters were used to identify and eliminate cases that were not attentive. This study sampled from the population of 18 to 26 year-old females who were not vaccinated against HPV. This sample was selected on the basis of the nature of the message topic. First, there are more severe health consequences of human papillomavirus (HPV) infections associated with females than with males (CDC, n.d.). Thus, it would be less challenging to arouse fear in females than in males from the standpoint of message design. Also, screening out males made it easier to design the message because HPV causes different cancers for them compared to females (CDC, n.d.). Additionally, the age cap for HPV vaccines recommended by CDC is 26 for women. Finally, filtering out those who had already received the vaccines was employed because the main purpose of the message was to promote HPV vaccination.

The resulting sample consisted of 306 participants ranging in age from 18 to 26 ($M = 23.08$, $SD = 2.49$). Fifty eight participants indicated that they didn't notice the pop-up windows. They were kept in the analyses given they did not differ from the rest with regard to their responses to any of the variables we measured (i.e., emotions, dependent variables, and mediators). Among the 306 participants, 76% identified as White, 10% as Black or African American, 10% as Asian or Pacific Islander, 8% as Hispanic, 2% as Native American or American Indian, and 2% as "other" without specifying their ethnicity; 8% identified with multiple ethnicities.

Statistical Power

A power analysis using G*power (Faul & Erdfelder, Lang, & Buchner, 2007) indicated that for a two-tailed test at $p < .05$, N of 306 provided power of .24, .95, and .99 for effect sizes of $f = .10$, .25, and .40, respectively.

Procedures

After indicating their consent to take part in the study, participants were asked to report their gender, age, and HPV vaccination status. Females in the 18 to 26 age group who had not received the HPV vaccine were led to the next part of the questionnaire. In the second part of the questionnaire, participants' racial/ethnic identifications were recorded. Then, they were told that the researchers were crafting a health message regarding HPV for a health promotion website. They were asked to assess a set of screenshots of the message from this website by answering a series of questions after they finished reading the message. They were told to pay attention to the message content and the usage of pop-up windows for advertising. Participants were randomly assigned into one of the five conditions with different versions of the threatening messages designed for the study. Emotional reactions to the message were measured right after the exposure. Then, participants listed all of their thoughts in six text boxes. The next section of the questionnaire collected information regarding participants' perceived severity, the perceived effectiveness of the message, and their behavioral intention – to get the vaccine, and their attitudes regarding the government's support of HPV prevention. Family history and friends' experience of HPV infection were also measured. Participants were then led to a distraction assignment – a math exercise with four linear equations with one unknown in each (e.g., $y - 6 = 2$, $y = ?$). After that, a recognition test with 16 statements was presented to participants for them to judge whether each statement was from the message they just read or not. Lastly, they were

asked to indicate whether they noticed a pop-up window and if so, what content the window presented, and how relevant the content was to the message.

Measures

Emotion measures. *Fear* was assessed by asking participants to indicate the extent to which the items of *afraid* and *scared* (Dillard & Anderson, 2004; Dillard & Peck, 2000) represented their feelings ($r = .92$, $M = .75$, $SD = 1.02$). *Disgust* was measured by *grossed out* and *sickened* (Nabi, 2002) ($r = .91$, $M = 1.11$, $SD = 1.20$), *anger* by *irritated* and *annoyed* (Dillard & Shen, 2005) ($r = .84$, $M = .50$, $SD = .80$), and *happiness* by *happy* and *cheerful* (Dillard & Peck, 2000) ($r = .90$, $M = .96$, $SD = 1.09$). All these emotions were measured with a 5-point Likert scale with 0 = *none of this feeling* and 4 = *a great deal of this feeling*.

Perceived severity. To measure the extent to which participants perceive the threat in the message as severe, a three-item scale was adapted from previous research (Dillard, Li, Meczkowski, Yang, & Shen, 2016). The items were: *I believe there are severe health risks associated with HPV infection*; *HPV infection has serious negative consequences*; and *HPV infection can be extremely harmful*. All these items were scored on 7-point Likert-type scales where 1 = *strongly disagree* and 7 = *strongly agree* ($\alpha = .87$, $M = 5.77$, $SD = 1.15$).

Memory. A recognition test was adapted from other research (e.g., Shapiro & Fox, 2002). Sixteen statements regarding the threat of HPV and the efficacy of HPV vaccination were created with half of them from the message – serving as target items. The other eight statements were drawn from official websites of reputable health organizations such as CDC, World Health Organization (WHO), and National Cancer Institution (NCI) and thus served as foils. Within each of these two categories, statements were spread out evenly such that there were two statements associated with each of the four sections of the message (i.e., severity, susceptibility,

response efficacy, & self-efficacy). Participants reported whether they believed the statement was from the message they read or not. The percentage of successful recognition of the statements from the message (termed a “hit”) was calculated for each participant.

Given that previous researchers (Leshner et al., 2009, 2011) mainly relied on the percentage of hits, sensitivity (A') and criterion bias (B''), the current study also adopted these measures for the purpose of results comparison. Percentage of the hits alone cannot provide a full picture of the memory effects because the correct rejection of foils is another piece of important information. Shapiro (1994) recommended two additional parameters. The first parameter, A'^1 , (Pollack & Norman, 1964) assesses to what extent the subject is sensitive to the hits. It is manifested as a ratio of hits to false alarms and thus is a better indicator than the percentage of hits alone. The higher the A' value, the more sensitive is an individual.

The second parameter, B''^2 , (Hodos, 1970) measures criterion bias. It indicates how confident an individual is in his/her identification of an object as being seen before. Its value varies between -1 and +1. The increase of B'' indicates the conservative tendency of an individual's identification of fewer false alarms and fewer hits. On the contrary, if an individual tends to be liberal and indicating more and more false alarms and hits, the B'' value decreases.

Each participant received a value of percentage of hits ($M = .82$, $SD = .18$), A' ($M = .80$, $SD = .22$), and B'' ($M = .02$, $SD = .72$). The mean value of .82 for the percentage of hits suggests that participants were able to successfully identify the majority of the statements that was from the message. B'' ranges from -1 to 1. A mean of .02 suggests that the average criterion bias in this

¹ $A' = 1 - \frac{1}{4} \left[\frac{p(FA)}{p(H)} + [1 - p(H)]/[1 - p(FA)] \right]$

² $B'' = \{p(H)[1 - p(H)] - p(FA)[1 - p(FA)]\} / \{p(H)[1 - p(H)] + p(FA)[1 - p(FA)]\}$

study is moderate. The value of A' does not have a fixed range. Thus, it is only meaningful to examine its magnitude in the context of comparison between different A' values.

Psychological reactance. The measure of self-reported anger and number of negative thoughts were combined to form the measure for reactance (Dillard & Shen, 2005). The measure of anger was described previously in the above emotion measures. As for negative thoughts, it was generated through the procedures suggested by Dillard and Shen (2005). Ten percent of the cases were randomly selected for the purpose of coding to establish inter-coder reliability. After reading through all the thoughts before coding, the two coders only identified less than 10 thoughts that were considered irrelevant to the message. These thoughts were eliminated from further coding steps. A total of 142 thoughts were coded for the next three steps of content analysis. A codebook was created for two coders to code the thoughts. First, the open-ended answers were divided into psychological thought units. Agreement between the coders was 92%. Then, thoughts were classified as either affective or cognitive with the guidance of a list of feeling items provided by Shaver, Schartz, Kirson, and O'Connor (1987). A good level of inter-coder reliability was achieved ($k = .95$). The thoughts that reported affect were removed because the self-report emotion measures had already captured message receivers' emotional experience (Dillard & Shen, 2005). Lastly, the data were segmented into three categories: supportive thoughts, neutral thoughts, and critical thoughts. Supportive thoughts were those "responses that expressed agreement with the message, self-identification, and positive thoughts toward the message, the message source, or the advocacy" (Dillard & Shen, 2005, p. 154). Critical thoughts were responses that expressed "disagreement with the message, negative intention to comply with the advocacy, intention to engage in the risky behavior, derogations of the source, etc." (p. 154). Non-evaluative responses were coded as neutral thoughts. Acceptable inter-coder

reliability was achieved ($k = .73$). A detailed descriptions of criteria for categorizing thoughts this way was provided in the codebook. Disagreements between coders regarding all three steps were resolved through discussion.

The number of the critical thoughts formed one of the two indicators of psychological reactance. The other indicator was the self-report anger after message exposure. Instead of using the raw scores of these two indicators, I transferred them into z -scores. This is due to the fact that the range of the anger measure was narrower than the one for negative thoughts, which would assign unequal weights to these two indicators. The two z -scores were summed and formed the measure of psychological reactance.

Perceived effectiveness of the message. Four 7-point semantic differential statements were adapted from Dillard and Ye (2008). Participants were instructed to evaluate to what extent they believed the message was *persuasive/not persuasive*, *effective/ineffective*, *convincing/not convincing* ($\alpha = .96$, $M = 5.24$, $SD = 1.58$).

Behavioral intention. To measure the extent to which participants would be willing to adopt the recommendations of the message, I asked them to indicate the likelihood of *talking to a doctor about the HPV vaccines*; *getting an HPV vaccine*; *requesting to get an HPV vaccine from a doctor* in the next several months on an 11-point response scale ranging from 0% to 100% with anchors representing 10-unit intervals ($\alpha = .96$, $M = 6.05$, $SD = 3.51$).

Attitudes toward government's support of HPV prevention. Four items were crafted to measure participants' attitude toward government's support of HPV prevention on a 7-point Likert-type scale with 1 = *strongly disagree* and 7 = *strongly agree*. The items were: *More resources should be put into the research about HPV and HPV related cancers*; *The government should educate the public regarding the benefits of HPV vaccination*; *HPV vaccines should be*

covered in the health insurance by insurance companies; and The government should provide funding to cover the costs of HPV vaccines ($\alpha = .86$, $M = 5.42$, $SD = 1.22$).

Control variables. Personal and family history of health issues related to HPV infection could potentially influence participants' attitudes and behavioral intentions toward the issue. Participants who had witnessed people around them dealing with health consequences of HPV infection might be more easily persuaded than otherwise. Thus, participants were asked to indicate whether they had family members or friends infected and dealt with HPV. Three options were provided: *Yes*, *No*, and *Not sure*.

Means and standard deviations across conditions for the study variables are shown below in Table 2. Bivariate correlations between the variables are presented in Table 3.

Table 2. *Means and Standard Deviations by Conditions*

	Fear + relevant disgust (<i>n</i> = 61)	Fear + irrelevant disgust (<i>n</i> = 61)	Fear + relevant non-disgust (<i>n</i> = 60)	Fear + irrelevant non-disgust (<i>n</i> = 59)	Fear only (<i>n</i> = 64)
Fear	1.13 (1.27)	0.72 (.90)	0.52 (.84)	0.65 (.91)	0.69 (1.03)
Disgust	2.07 (1.19)	1.35 (1.32)	0.77 (.96)	0.75 (1.04)	0.61 (.81)
Anger	0.62 (0.91)	0.47 (.74)	0.44 (.75)	0.58 (.92)	0.41 (.66)
Happiness	0.73 (0.96)	0.86 (1.06)	1.15 (1.12)	1.01 (1.08)	1.06 (1.19)
Intention	6.37 (3.51)	5.78 (3.43)	5.67 (3.66)	6.58 (3.44)	5.88 (3.52)
Perceived effectiveness	5.29 (1.47)	5.08 (1.64)	5.39 (1.46)	5.36 (1.45)	5.08 (1.84)
Attitudes toward government	5.46 (1.38)	5.29 (1.21)	5.37 (1.19)	5.39 (1.19)	5.60 (1.16)
Severity	5.89 (1.05)	5.54 (1.40)	5.96 (1.00)	5.63 (1.34)	5.82 (.89)
Percentage of hits	0.84 (0.17)	0.80 (.21)	0.79 (.22)	0.86 (.16)	0.82 (.16)
Sensitivity	0.80 (0.20)	0.78 (.24)	0.77 (.25)	0.83 (.18)	0.80 (.23)
Criterion bias	0.03 (0.73)	-0.03 (.65)	0.13 (.71)	-0.10 (.74)	0.09 (.74)
Psychological reactance ^a	-0.10 (1.41)	0.20 (1.65)	-0.09 (1.32)	-0.02 (1.57)	0.001 (1.69)

^aPsychological reactance was the sum of two *z*-scores.

Table 3. *Bivariate Correlations*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Fear	.92														
2. Disgust	.44**	.91													
3. Anger	.26**	.35**	.84												
4. Happiness	-.11	-.15**	-.02	.90											
5. Relevance	.10	.20*	.03	.02	N/A										
6. Intention	.31**	.15**	-.03	.05	.18*	.96									
7. Perceived effectiveness	.25**	.14*	-.08	-.03	.17*	.67**	.96								
8. Attitudes government	.18**	.04	-.09	-.01	.08	.56**	.57**	.86							
9. Severity	.16**	.06	-.17	-.05	.15*	.37**	.54**	.41**	.87						
10. Hits ^a (%)	.05	.06	-.13*	-.04	-.02	.13*	.22**	.25**	.24**	N/A					
11. Sensitivity ^a	-.03	-.03	-.13*	-.14*	-	-.07	.01	.06	.06	.57**	N/A				
12. Criterion bias ^a	-.13*	-.13*	-.06	-.10	-.02	-	-.10	-.08	-.06	-.23	.10	N/A			
13. Reactance ^b	.03	.13*	.47**	.01	-.07	.15**	-.40**	-.53**	-.38**	-.39**	-.11*	-.08	-.01	N/A	
14. Family HPV history ^c	.10	-.07	.01	-.06	-.05	.03	.07	.07	.12*	.01	-.06	.001	-.05	N/A	
15. Friends HPV history ^c	-.12*	-.12*	-.01	.09	-.02	.03	.11*	-.03	.07	.03	-.10	.06	-.11*	.46**	N/A
<i>M</i>	.75	1.11	.50	.96	/	6.05	5.24	5.42	5.77	.82	.80	.02	.00	/	/
<i>SD</i>	1.02	1.20	.80	1.09	3.54	3.51	1.58	1.22	1.15	.18	.22	.72	1.53	/	/
Range	0 – 4	0 – 4	0 – 4	0 – 4	1 – 7	1 – 11	1 – 7	1 – 7	1 – 7	0 – 1	/	-1 – 1	/	1 – 3	1 – 3

Note. *N* = 306. Cronbach's alpha values are shown in diagonal. * $p < .05$, ** $p < .01$.

^a The three memory indicators are not multi-item scales and thus no Cronbach's alpha values are reported. No range is provided for sensitivity because it is the difference of two means.

^b Psychological reactance is the sum of *z*-scores. No Cronbach's alpha values and ranges are provided.

^c No means and standard deviations are reported for these two categorical variables.

Chapter 4

Results

Manipulation Checks

A multivariate analysis of variance (MANOVA) was conducted to examine participants' self-reported emotional reactions (i.e., fear, disgust, anger, and happiness) to and their relevance assessment of the messages across conditions. The analysis revealed a significant main effect for condition, Pillai's $V = .61$, $F(20, 968) = 8.68$, $p < .001$, partial $\eta^2 = .15$. The univariate analysis for conditions returned a significant effect for disgust, $F(4, 243) = 12.98$, $p < .001$, partial $\eta^2 = .18$. As shown in Figure 1, this effect occurred because participants in the relevant disgust ($M = 1.91$, $SE = .16$) and irrelevant disgust ($M = 1.40$, $SE = .14$) conditions reported higher level of disgust than those in the conditions of relevant non-disgust ($M = .84$, $SE = .16$), irrelevant non-disgust ($M = .70$, $SE = .15$), and fear only ($M = .59$, $SE = .14$). Participants' ratings in the two conditions with disgust-elicitors did not differ from each other. These findings suggest that the manipulation of disgust worked as planned.

As expected, no significant differences were found in the univariate analysis for fear, $F(4, 243) = .40$, $p > .05$, partial $\eta^2 = .007$; anger, $F(4, 243) = .62$, $p > .05$, partial $\eta^2 = .01$; and happiness, $F(4, 243) = .94$, $p > .05$, partial $\eta^2 = .01$. The levels of fear for all the five conditions are shown in Figure 1.

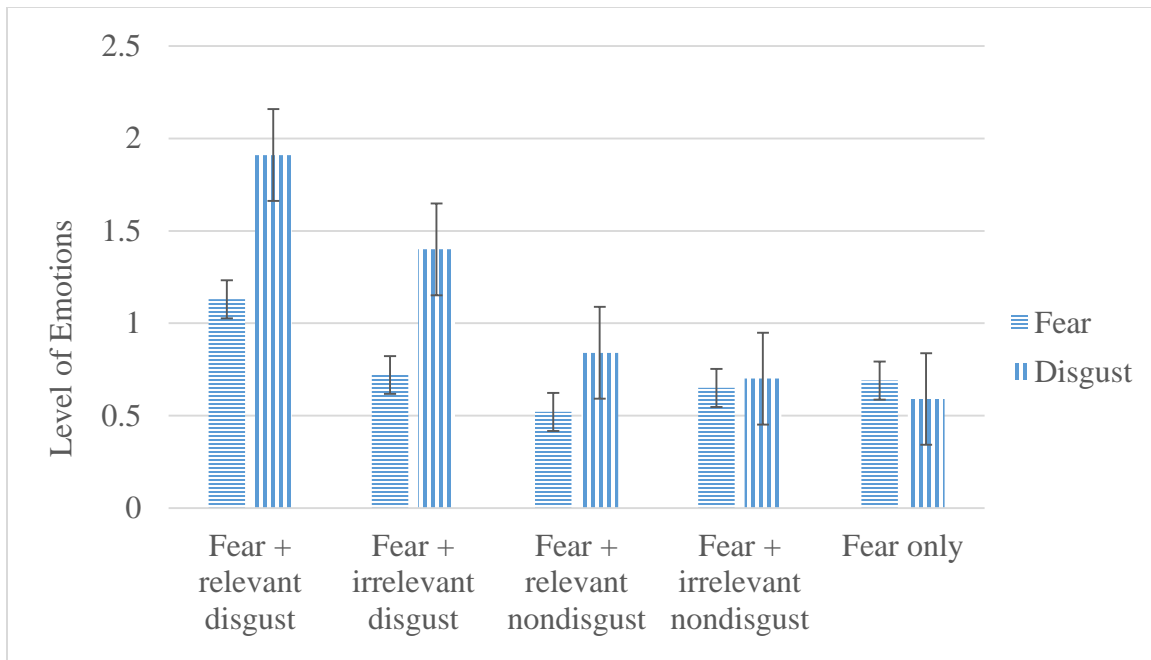


Figure 1. Disgust and fear across conditions.

The univariate analysis for condition also revealed a significant effect for relevance, $F(4, 243) = 42.13, p < .001$, partial $\eta^2 = .41$. As illustrated in Figure 2, this effect occurred because relevant disgust ($M = 5.36, SE = .28$) and relevant non-disgust ($M = 5.83, SE = .28$) were rated significantly more relevant than the irrelevant disgust ($M = 2.29, SE = .24$), irrelevant non-disgust ($M = 2.47, SE = .26$), as well as the fear only ($M = 2.58, SE = .24$) conditions, whereas the two relevant conditions didn't differ in their relevance ratings. Thus, the relevance manipulation also worked as expected.

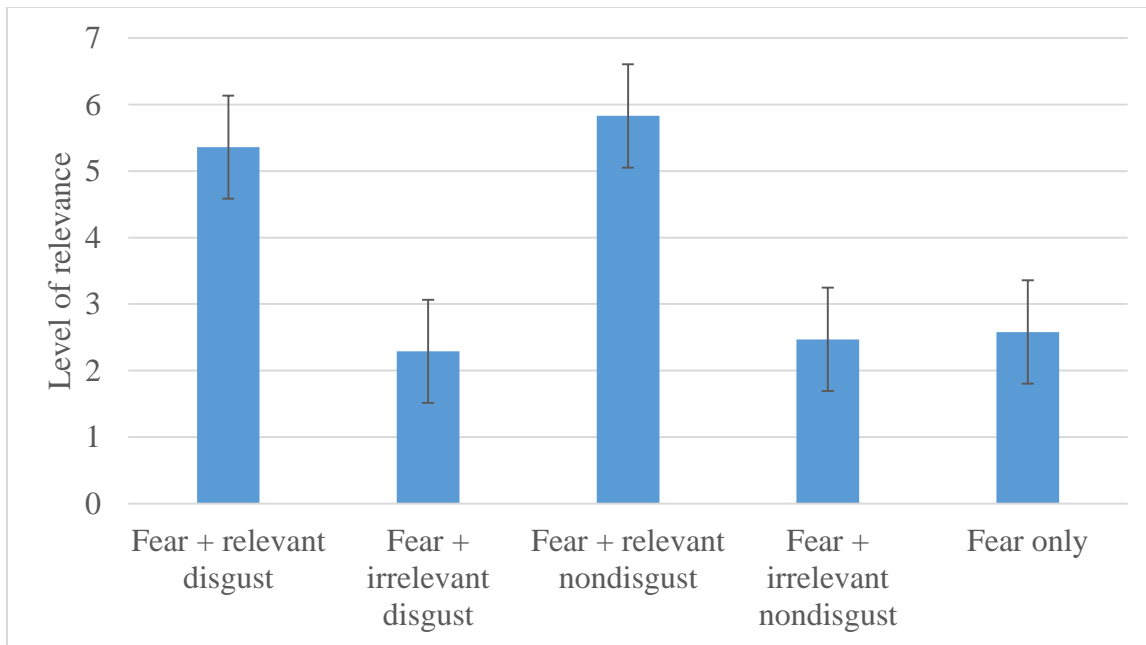


Figure 2. Relevance across conditions.

Hypotheses Tests

Persuasive outcomes across conditions. Hypotheses H1a, H2, H3a, H3b, and H4a predicted different persuasive outcomes across the five conditions. H1a and H1b both expected superior persuasive outcomes for the condition with relevant disgust elements compared to any other conditions (messages with irrelevant disgust feature, with irrelevant non-disgust component, with relevant non-disgust elicitors, and fear-only messages). H3a and H3b anticipated worse retention and persuasive outcomes associated with the two conditions with disgust elicitors embedded, regardless of the relevance of the elicitors to the message topic, compared to the other three conditions without disgust elements included. H4a predicted that the relevant disgust condition should be less persuasive than the other conditions, if psychological reactance was activated. H1b and H4b further explained why the outcomes would occur – how different variables mediate the process: perceived severity in H1b and reactance in H4b. Note that H4a and H4b

hinged upon RQ1 – the question asking whether psychological reactance was activated in any of the five conditions.

To test RQ1, the raw score mean of psychological reactance (the sum of raw score of anger and number of negative thoughts) was compared to zero. Five single-sample two-tailed t-tests were conducted. The results suggested that psychological reactance in the fear and relevant disgust condition ($M = 1.69$, $SD = 2.31$) was significantly greater than zero, $t(60) = 5.70$, $p < .001$. Analyses returned similar findings for the fear and irrelevant disgust condition ($M = 2.28$, $SD = 2.68$), $t(61) = 6.40$, $p < .001$, the fear and relevant non-disgust condition ($M = 1.74$, $SD = 2.23$), $t(59) = 6.04$, $p < .001$, the fear and irrelevant non-disgust condition ($M = 1.85$, $SD = 2.62$), $t(58) = 5.41$, $p < .001$, and the fear only condition ($M = 1.84$, $SD = 2.71$), $t(63) = 5.43$, $p < .001$. Thus, the answer to RQ1 is that psychological reactance was detected in all the five conditions. Figure 3 below shows the level of psychological reactance in each of the five conditions.

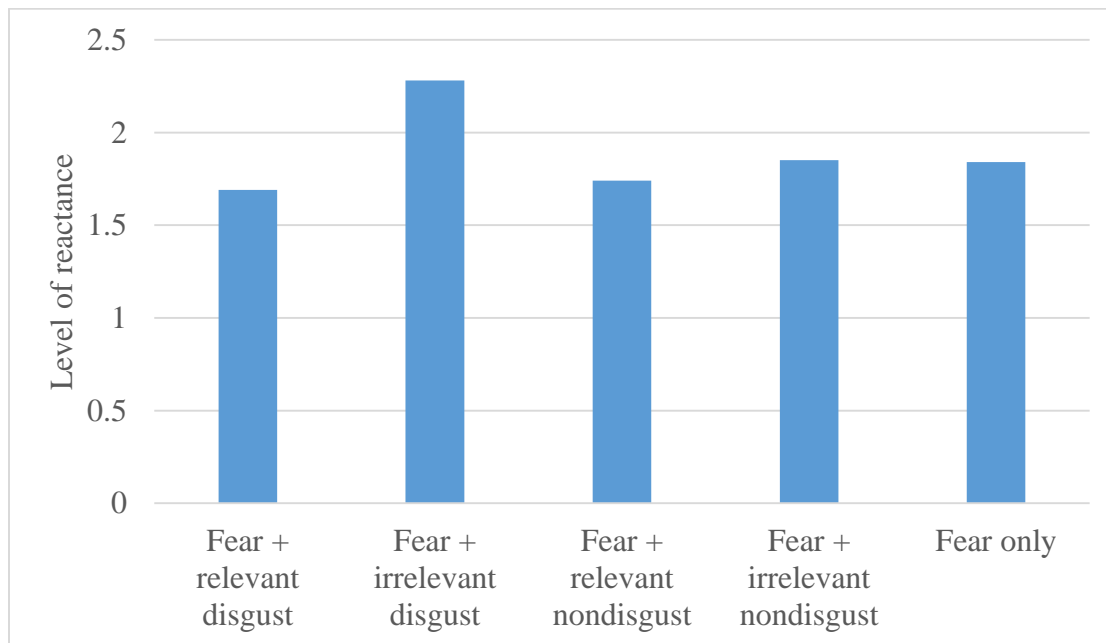


Figure 3. Psychological reactance across conditions.

H3a predicted that messages with disgust elicitors should be associated with worse memory effects, compared to the ones without disgust-eliciting content. Given the fact that there are three indicators for memory, a multivariate analysis of covariance (MANCOVA) was conducted to test this hypothesis with family and friend HPV history as covariates. The results did not reveal any significant differences in any of the three memory indicators across the five conditions, Wilks' $\Lambda = .97$, $F(12, 786) = .79$, $p > .10$, partial $\eta^2 = .01$.

H1a, H2, H3b, and H4a made predictions about the relationships between conditions and the three dependent variables – perceived effectiveness of the message, behavioral intention, and attitude toward government support on HPV. Specifically, H1a and H2 both predicted that participants in the relevant disgust condition should report higher means in the three dependent variables compared to other conditions. According to H3b, the two conditions with disgust elicitors embedded should return worse persuasive outcomes than the other three conditions that did not have disgust elements included. H4a anticipated that the relevant disgust condition was less persuasive than the other conditions based on the premise of psychological reactance being activated. A multivariate analysis of covariance (MANCOVA) was conducted with family and friend HPV history as covariates. The results did not reveal any significant differences in any of the three DVs across the five conditions, Wilks' $\Lambda = .96$, $F(2, 93) = 1.00$, $p > .10$, partial $\eta^2 = .01$. Thus, none of the four predictions (H1a, H2, H3b, and H4a) was supported.

Mediation tests. To test whether the two proposed variables – perceived severity and psychological reactance – mediated the relationship between the condition and the three dependent variables (i.e., perceived effectiveness of the message, behavioral

intention, and attitude toward government support on HPV), structural equation modeling was employed. Bootstrapping with 2000 bootstrap samples and bias-corrected confidence intervals was used in the testing of these indirect effects (Hayes, 2013). Condition was dummy coded with the fear-only condition as the reference group, which resulted in four predictors being put into the models. The path from each of these four exogenous variables to the mediator represents the comparison between the corresponding predictor and the control – the fear only condition. Perceived effectiveness of the message, behavioral intention, and attitude toward government's support on HPV entered the models as dependent variables. Perceived severity and psychological reactance were introduced into the model as mediators that mediated the relationships between the dummy coded conditions and the three dependent variables. The two mediators were entered into the model simultaneously. Figure 4 illustrates how the model was structured. The direct paths from the exogenous variables to the three persuasive outcomes are not shown in the figure but were tested in the analyses. Perceived severity and the three dependent variables were cast as latent variables and their error variance was set at $(1 - \alpha) \times \text{variance of the scale}$ (Bollen, 1989). The dummy coded exogenous variables were allowed to correlate with each other.

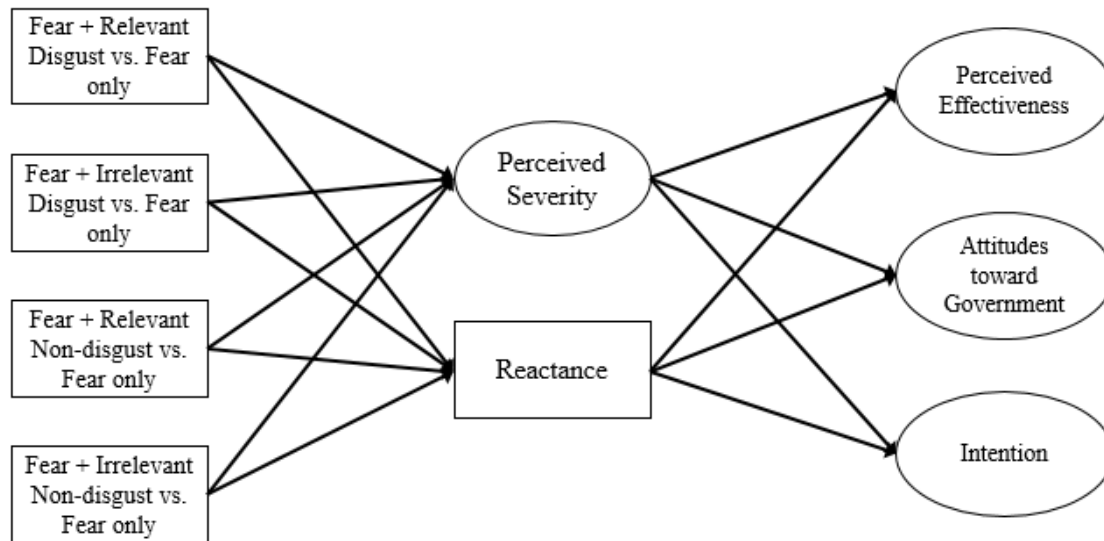


Figure 4. The model for mediation analysis. The direct paths from the four exogenous variables to the three endogenous variables are not shown here but were tested in the analysis.

The fit indices returned from the initial analysis were not ideal, $\chi^2(4) = 216.47$, $p = .000$, CFI = .71, RMSEA = .42 (90% CI: .37 - .47). Based on the recommendations from the modification indices, the model was respecified by allowing the three disturbance terms of the endogenous variables to correlate. Also, the correlation between the disturbance terms of the two mediators was allowed. This respecification resulted in a saturated model with no fit indices to report. None of the indirect effects of conditions on persuasive outcomes through perceived severity or reactance was statistically significant with B ranged from $-.26$ ($SE = .21$) to $.13$ ($SE = .17$) and p values all greater than .10. These results suggest that the predicted mediation effects in H1b to H4b were not supported.

Exploratory Analyses

To investigate the persuasive role of disgust in threat appeals, this study tested predictions generated from four types of theoretical perspectives via an online experiment. None of the hypotheses was supported. The five conditions did not differ in any of the three persuasive outcomes. The proposed mediations were not identified either.

The proposed effects were comparisons between control condition and the conditions with different combinations of disgust and relevance. Although they were not supported by the data, it is worth exploring whether presence of disgust made a difference regardless the level of relevance, and vice versa. Also, all the hypotheses focused on the impact of message features that elicit disgust and fear, not the self-reported emotional experiences. The effects of self-reported emotions on persuasion should also be tested. To examine these possible effects, a number of different exploratory analyses were conducted.

Examine the effects of disgust and relevance separately. H1a, H2, H3b, and H4a primarily predict the effects of different combinations of disgust and relevance, compared to the control condition. Although they were not supported by the data, it's possible that relevance may have affected the persuasive outcomes regardless the level of disgust, or the activation of disgust engendered attitude and behavior change no matter whether the message was relevant to the topic or not.

To assess the possibility that disgust had impacted persuasion in general, the two disgust presence conditions and the two non-disgust conditions were collapsed. To check whether the three conditions (collapsed disgust, collapsed non-disgust, and the fear only conditions) differed in disgust and other emotions, a multivariate analysis of variance (MANOVA) was conducted. The analysis revealed a significant main effect for

condition, Pillai's $V = .18$, $F(8, 598) = 7.52$, $p < .001$, partial $\eta^2 = .09$. The univariate analysis for conditions returned a significant effect for disgust, $F(2, 301) = 29.58$, $p < .001$, partial $\eta^2 = .16$. Post hoc comparisons showed that this effect occurred because the collapsed disgust ($M = 1.70$, $SE = .10$) condition was higher in disgust than the non-disgust ($M = .77$, $SE = .10$) and fear only ($M = .62$, $SE = .14$) conditions, while the latter two did not differ from each other. No difference revealed across conditions for the other three emotions.

A second multivariate analysis of covariance (MANCOVA) was conducted to check whether these three conditions differed in any of the three persuasive outcomes. Family and friend HPV history were again treated as covariates. No significant differences were identified, Wilks' $\Lambda = .98$, $F(6, 598) = 1.14$, $p > .10$, partial $\eta^2 = .01$.

Similar analyses were employed to examine the potential main effects of relevance. No significant differences yielded on persuasive outcomes across conditions, Wilks' $\Lambda = .95$, $F(6, 598) = 1.26$, $p > .10$, partial $\eta^2 = .01$.

Did self-reported disgust and fear affect persuasive outcomes? The hypotheses predicted differences across conditions. However, the real interest of the study is whether emotions (mainly disgust and fear) induced by the messages affected persuasive outcomes. As O'Keefe (2003) notes, in some communication research, variations on messages serve the purpose of eliciting certain psychological states among participants. The real focus is the relationship between these psychological states (e.g., emotional reactions) and their impact on persuasion. To examine whether participants' emotional responses affected the three dependent variables both directly and indirectly, a number of analyses were conducted.

Direct effects of disgust and fear on memory and persuasive outcomes. To test whether emotions affected participants' memory, attitudes, and behavioral intentions, multiple regressions were employed with mean-centered fear, disgust, and the disgust \times fear interaction as the predictors. The three parameters of memory (i.e., percentage of hits, sensitivity, and criterion bias), perceived effectiveness, intention, and attitude toward government's support were tested as dependent variables, respectively. As shown in Table 4, fear was significantly associated with perceived effectiveness, intention, and attitude toward government but not the three memory parameters. Self-reported disgust was not related to any of the six dependent variables. As for disgust \times fear interaction, it was significantly associated with criterion bias, $\beta = -.13$, $p < .05$. As shown in Figure 5, when disgust is low, elevation in fear results in increase of criterion bias (B'') – a tendency of being conservative such that individuals report fewer hits and false alarms. This can be interpreted as an increase of attention (Ye & Van Raaij, 2004) and better memory (Leshner et al., 2009). On the contrary, when disgust is at and above its mean, an increase in fear leads to the decrease of B'' , suggesting individuals tend to report more hits and false alarms – an indication of decreased attention (Ye & Van Raaij, 2004) and worse memory (Leshner et al., 2009).

Table 4. *Emotions' Impact on Memory, Perceived Effectiveness, Intention, and Attitudes toward Government*

	Dependent Variables					
	Memory			Perceived Effectiveness	Intention	Attitude toward Government
	Percentage of Hits	Sensitivity	Criterion Bias			
	β	β	β	β	β	β
Fear	-.02	-.03	-.03	.23**	.31***	.20**
Disgust	.03	-.03	-.07	.04	.02	-.05
Disgust \times Fear Interaction	.11	.04	-.13*	.005	-.01	.01

Note. For percentage of hits, $F(3, 302) = 1.30$, adjust $R^2 = .003$, $p = .27$; for sensitivity, $F(3, 302) = .25$, adjust $R^2 = -.007$, $p = .86$; for criterion bias, $F(3, 302) = 3.99$, adjust $R^2 = .03$, $p < .05$. For perceived effectiveness, $F(3, 302) = 6.66$, adjust $R^2 = .05$, $p < .001$; for intention, $F(3, 302) = 10.94$, adjust $R^2 = .09$, $p < .001$; and for attitudes toward government, $F(3, 302) = 3.79$, adjust $R^2 = .03$, $p < .05$.

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

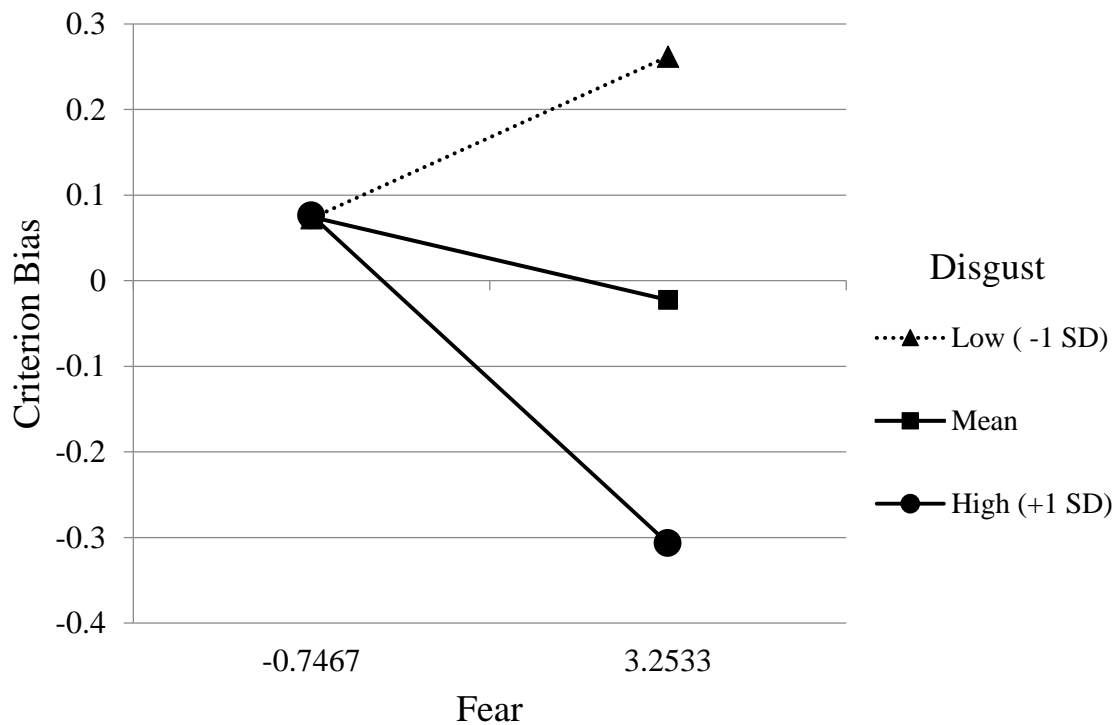


Figure 5. The disgust \times fear interaction effects on criterion bias.

Note. Higher values suggest increase of the attention.

Mediation analyses: Did disgust and fear influence attitude and behavioral intention via psychological reactance? Emotions elicited by the threatening messages could potentially influence the dependent variables through mediators as well. Thus, the indirect effects of emotions on the dependent variables were examined. Among the three proposed mediators, perceived severity and memory were not tested for mediation between self-reported emotions and persuasive outcomes. For memory, as mentioned previously, it is typically not regarded as a mediator for persuasion. Perceived severity can potentially function as a mediator between persuasive outcomes and message features that elicit emotions – message content that highlights the threat of a hazard should be positively associated with perceived severity, which in turn leads to attitude and behavior change. However, when it comes to self-reported emotional experiences, perceived severity is considered as the cause rather than the consequence of such emotional experience (e.g., Frijda, 1986; Lazarus, 1991). The assessment of perceived severity is part of the appraisal that is precedent to the emotional experience. Therefore, perceived severity cannot be treated as a mediator between emotions and persuasive outcomes. Rather, it operates via emotions such as fear on persuasive outcomes. Such a role of perceived severity was not tested because it was not the interest of this study.

To test the indirect effects of self-reported fear and disgust on persuasion via reactance, a mediation analyses was employed. Figure 6 illustrates the model of this mediation analysis. Reactance was cast as a manifest variable. All other variables entered the model as single-indicator latent variables. The three exogenous variables were all mean-centered and were allowed to correlate. Error variances for all the variables were set at $(1-\alpha) \times \text{variance of the scale}$ (Bollen, 1989). Bootstrapping with 2000 bootstrap

samples and bias-corrected confidence intervals was employed in the testing of the indirect effects (Hayes, 2013).

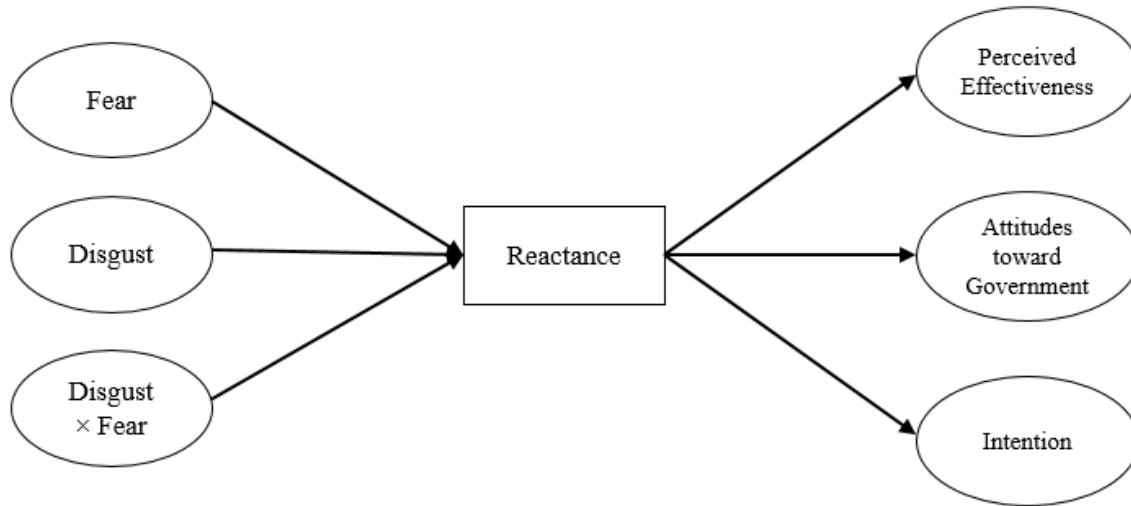


Figure 6. The model of mediation analysis testing how emotions affect persuasion via reactance. The direct paths from the three exogenous variables to the three endogenous variables are not shown here but were tested in the analyses.

The model fit was not ideal, $\chi^2(3) = 187.19, p = .000$, CFI = .71, RMSEA = .45 (CI: .39 -.50). The model was respecified by allowing the disturbance terms of the three dependent variables to correlate, which resulted in a saturated model with no model fit indices available to report. The results showed that the effects of disgust on the three dependent variables via reactance were all approaching significance (p values varied from .078 to .085) with B of -.11 (SE = .07) for perceived effectiveness, -.19 (SE = .12) for intention, and -.06 (SE = .04) for attitudes toward government. Other indirect effects of fear or the disgust \times fear interaction on the three dependent variables via reactance were not significant with p values all greater than .10 (ranged from .38 to .63).

The impact of disgust and fear on proposed mediators. The impact of disgust and fear on the proposed mediators (i.e., perceived severity and psychological reactance)

should be examined in two ways. First, condition can be used as the independent variable to assess whether the five different conditions differed in any of the mediators. This is a test of the effects of message features. Second, when the mediators are regressed on self-reported disgust and fear, and the interaction term of disgust and fear, we can tell whether the elicited emotional reactions influenced the mediators. Note that perceived severity could not be tested for mediation when the independent variables are self-reported emotions because it is part of the appraisal process and thus should be considered as the cause rather than the consequences of emotional reactions (e.g., Lazarus, 1991).

Message features and their impact on mediators. The proposed mediations shown in Figure 1 were not supported by the data. Specifically, the indirect effects from conditions to the three persuasive outcomes via the three mediators (i.e., perceived severity and psychological reactance) were not statistically significant. However, one might wonder whether the five different conditions differed in any of the two mediators. To test this possibility, a multivariate analysis of variance (MANOVA) was conducted to assess whether there was any difference in perceived severity and psychological reactance across the five conditions. The analysis returned a non-significant main effect for conditions, Pillai's $V = .05$, $F(20, 1200) = .83$, $p = .68$, partial $\eta^2 = .01$, suggesting that no differences were identified in any of these three mediators among the five conditions.

Self-reported emotions and their impact on mediators. Although the manipulation on disgust did not yield any differences in the three proposed mediators, it is possible that the emotional reactions elicited by the message features influenced these mediators. To assess this possibility, the mediators should be regressed on self-reported

fear and disgust and their interaction term. However, perceived severity was not tested because it is part of the appraisal process and thus should be considered as the cause rather than the consequences of emotional reactions (e.g., Lazarus, 1991). Therefore, only one multiple regression analysis was conducted with reactance as the dependent variable, and fear, disgust, and the disgust \times fear interaction as the predictors. These emotion variables were mean-centered.

As shown in Table 5, self-reported disgust was significantly associated with reactance, $\beta = .13$, $p = .038$. Neither fear nor the disgust \times fear interaction was related with reactance.

Table 5. Self-reported *Emotions' Impact on Psychological Reactance*

	Dependent Variable
	Psychological Reactance
	β
Fear	-.05
Disgust	.13*
Disgust \times Fear Interaction	.04

Note. $F(3, 302) = 1.90$, adjust $R^2 = .01$, $p = .13$.

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

Chapter 5

Discussion

Disgust-elicitors and Persuasive Outcomes: Did Message Features Impact Persuasion?

The central focus of this study is the role of disgust in threat appeals. No significant persuasive effects were identified across conditions. The five conditions did not differ in perceived effectiveness of the messages, attitudes toward government's support on HPV, and participants' intention to receive HPV vaccines. This cannot be attributed to the failure of manipulation on disgust or other emotions. As shown in the manipulation checks, the two conditions with disgust-eliciting elements were higher in self-reported disgust than the other three non-disgust conditions. Further, they did not differ in other emotions.³ Obviously, the messages worked as expected.

Could the lack of statically significant findings be due to the low statistical power of the current dataset? As mentioned, the post hoc power analysis suggests that this dataset ($N = 306$) provided the power of .24, .95, and .99 for bivariate effect sizes of $f = .10$, .25, and .40, respectively, for a two-tailed test at $p < .05$. Thus, the fact that no difference was found in persuasion across conditions is unlikely due to the statistical power of the current dataset unless the true population effect size is small (e.g., $f \leq .10$).

If the manipulation functioned as anticipated and enough statistical power was high, why were differences in persuasion not detected across conditions? One possibility is that the disgust and fear manipulation was not strong enough. In a study conducted by Jónsdóttir and colleagues (2014), participants were exposed to six antismoking campaign video messages. Then, they

³ The relevant disgust condition was higher in self-reported fear than other conditions. But this effect disappeared in the multivariate analysis when other emotions were included as the dependent variables, as shown in the results from manipulation checks.

reported their emotional reactions (i.e., disgust and fear) toward the messages and the extent to which they believed the messages were effective in persuasion. Three video clips were perceived as less effective than the other half. The authors attributed this difference to the presence or absence of the graphic imagery that highlights the consequences of smoking. A close look at the means of self-reported emotions for all these six advertisements suggests another possibility. The three more effective messages all had ratings of both disgust and fear higher than the midpoint of the 5-point scale whereas the other three messages were mostly below the midpoint. This seems to suggest that the lower the levels of disgust and fear, the less persuasive the messages are.

In the current study, the average ratings for both disgust and fear in all of the five conditions were below the midpoint of the 5-point scale, as shown in Table 2. This indicates that the amount of disgust and fear elicited by the messages may not have been sufficient to make them persuasive. In fact, levels of disgust and fear in this study were generally lower than the three less persuasive messages in Jónsdóttir et al. (2014). Thus, the reason that no difference was revealed across conditions in persuasion could be that the amount of disgust and fear elicited by the messages were insufficient.

Self-reported Disgust and Persuasion

No relationship between the presence/absence of disgust-elicitors and persuasion was found in the current study. However, there is some evidence suggesting that self-reported disgust was associated with persuasive outcomes.

As reported earlier, mediation analysis identified some borderline significant indirect effects of self-reported disgust on persuasion via reactance ($B_{\text{Perceived Effectiveness}} = -.11$, $B_{\text{Intention}} = -.19$, and $B_{\text{Attitudes toward Government}} = -.06$) with p values between .07 and .08. This pattern suggests that when message recipients experience disgust during and after the exposure to the message,

they are less likely to be persuaded due to the influence of reactance. This effect will be discussed more thoroughly in the following sections.

If retention of the message content is considered as one of the objectives of persuasion, this study shows that self-reported disgust can affect this persuasive outcome directly. As shown in Table 4, the disgust \times fear interaction was significantly associated with criterion bias – one of the three parameters of memory. When significant amount of disgust was induced, the increase of fear led to worse memory. However, when the aroused disgust level was low, escalation of fear made it easier for individuals to remember the message content. More detailed discussion regarding this effect is presented in the next section.

Thus, although the direct effects of self-reported disgust on attitude and behavioral intention were not detected in the current study, disgust was found to be a significant predictor of message retention. In addition, the pattern it manifested in its indirect influence on persuasion via reactance suggests that self-reported disgust could affect persuasion indirectly.

Disgust and Memory

No difference in memory was detected across conditions, suggesting that incorporation of disgust elicitors into the message did not result in any differences in memory. However, there is some evidence showing that self-reported disgust can influence memory. As mentioned previously, co-activation of disgust and fear was negatively associated with criterion bias ($\beta = -.13, p < .05$). Specifically, when the self-reported disgust level is low, the higher the fear, the better the memory. However, when significant amount of disgust is induced, fear and memory are negatively related such that the increase of fear results in worse memory of the message. In other words, the influence of fear on memory is contingent upon the level of disgust such that

individuals remember the message content better when the level of disgust is low rather than high.

This finding is consistent with the cognitive overload perspective (Leshner et al., 2009; 2011) such that co-activation of disgust and fear is detrimental to memory. However, there is a significant difference between that line of research and this study. Research guided by cognitive overload perspective can be considered as a test of the relationship between memory and message manipulation (O'Keefe, 2003). It often does not assess the emotional experience reported by the participants during or after the exposure to the message. The self-reported measures of emotions are typically used in the pretest to help researcher identify the most potent emotion-eliciting stimuli. This line of research relies heavily on psychophysiological measures (e.g., facial electromyography data) to assess individual's emotional experience. From the perspective of discrete emotions (Nabi, 2002), an indispensable component of emotion – subjective feeling state – would be considered as missing in this line of research. This study, on the other hand, collected information of self-reported emotional experience and examined its influence on memory. Thus, this study supplements the inquiry on relationship between disgust and memory.

Although co-activation of disgust and fear is found to be detrimental to memory, it did not lead to worse persuasive outcomes than otherwise. Criterion bias was found to be negatively related to behavioral intention ($r = -.15, p < .01$). In other words, the less message content an individual can recognize, the more likely he/she is to engage in the recommended behaviors. This negative path between message recognition and persuasion has been reported in other studies in the literature (e.g., see Greenwald, 1968). Retention of message content does not necessarily have to be positively associated with message acceptance. As aforementioned, high

level of criterion bias is considered as an indication of an individual being highly attentive. In persuasion literature, attention is not always positively associated with persuasive outcomes. Its impact on persuasion can be moderated by other factors. For example, when a message is perceived as weak in argument strength, paying close attention to it would actually attenuate persuasion (Petty & Cacioppo, 1984). In this study, the strength of the argument is not likely to be accounting for this negative association between criterion bias and behavioral intention because the messages were perceived as effective ($M = 5.24$, $SD = 1.58$).

There is some evidence that reactance was aroused in this study, as discussed in the next section. Reactance can potentially mediate the relationship between criterion bias and behavioral intention such that the more attentive the message recipients are, the more reactance are aroused, which in turn results in lower level of behavioral intention. However, this is not likely to be the case given the fact that criterion bias was not significantly associated with reactance ($r = -.01$, $p = .85$). More research is needed to investigate this negative association between memory/attention and behavioral intention.

Disgust and Psychological Reactance

Psychological reactance was detected in all of the five conditions, suggesting that persuasive messages can elicit reactance. Previous research (e.g., Erceg-Hurn & Steed, 2011; LaVoie, Quick, Riles, & Lambert, 2017; Wolburg, 2006) has found that disgust elicitors – especially graphic elements in threat appeals – can activate psychological reactance. However, no significant differences in reactance was manifested across conditions in this study, suggesting that the manipulation of disgust elicitors did not impact the level of reactance. However, when self-reported disgust and fear and their interaction term were used as predictors, there is a significant association between disgust and reactance, $\beta = .13$, $p = .038$, as shown in Table 5. The

zero-order correlation coefficient between disgust and reactance was also statistically significant ($r = .13, p < .05$). Thus, although the manipulation of disgust failed to produce any differences in psychological reactance, disgust as an emotional response to the message was found to be associated with reactance.

When focusing on the influence of message features on psychological reactance, researchers (LaVoie, Quick, Riles, & Lambert, 2017) have reported that the impact of fear and disgust elicitors contained in the message on psychological reactance is mediated by the perceived threat to freedom. In this study, self-reported disgust rather than the message features was found to be associated with psychological reactance. More research is warranted for understanding the underlying mechanism.

Reactance was also found to function as a mediator for the association between self-reported disgust and persuasive outcomes. As reported in the exploratory analyses section, these indirect effects via reactance were approaching significance with p values ranged from .07 to .08. This pattern suggests that disgust as an emotional reaction to threatening messages can potentially influence persuasive outcomes via psychological reactance. The fact that these effects were all negative ($B_{\text{Perceived Effectiveness}} = -.11$, $B_{\text{Intention}} = -.19$, and $B_{\text{Attitudes toward Government}} = -.06$) shows that the more disgust is aroused, the less persuasive a threatening message could potentially be. This pattern is consistent with the finding that reactance negatively impacts persuasive outcomes (e.g., Moyer-Gusé & Nabi, 2010).

In sum, although the presence/absence of disgust elicitors did not make any difference in either psychological reactance or persuasive outcomes, there is some evidence to suggest that self-reported disgust impacted both reactance and persuasion.

Implications, Limitations, and Future Directions

Although the predicted effects of disgusting elements on persuasion were not detected, we did find that self-reported disgust impacted persuasive outcomes via psychological reactance. Previous research found that message features that elicit disgust could impact persuasive outcomes. Although this effect for message features was not identified in this study, the data suggested that disgust as emotional experience could affect persuasive outcomes. Similar to what is reported in previous research (Leshner et al., 2009, 2011), elicitation of significant amount of both disgust and fear can result in diminished memory compared to otherwise. This finding together with the ones from previous research suggest that when crafting threatening messages, designers should try to avoid arousing both fear and disgust. In other words, making people feel both disgusted and fearful of a certain threat is not a good way to help them to memorize the message content, nor does it encourage attitude and behavioral change. In fact, when a message recipient experienced both fear and disgust, he will less likely to adopt the recommendation because he will be resistant to the persuasive effort, as evidenced in the negative indirect effects of disgust on persuasion via reactance.

The manipulation on disgust was successful. However, disgust across conditions did not produce any differences in the persuasive outcomes or the several proposed mediators. As discussed earlier, this could be due to the fact that the amount of disgust and fear elicited by the message were not sufficient. More research is needed to further examine the relationship between message features that elicit disgust and fear, self-reported disgust and fear, and persuasive outcomes.

One limitation of this study is the usage of a single message. Participants were exposed to the message that was designed to focus on the issue of HPV and HPV vaccination. It is unclear to what extent that the results of the study are due to the impact of unique features of the

message and the topic. Future research should investigate the issue with multiple messages across topics. The inability to detect small effects consists of the second limitation. Researchers should study how emotions impact persuasion with greater statistical power that enables them to examine small effect sizes. A third limitation is the narrow sample in terms of the age, gender, and HPV vaccination status. The participants were from a subset of the general population – females aged 18 to 26 who did not receive HPV vaccines. Thus, the external validity of this study is decreased. The fairly homogeneous nature of this group makes it hard to generalize the findings to other subgroups in the population or to the general population. Future scholarship could investigate the persuasive effects of disgust by using participants with different demographic characteristics. Also, it is possible that ceiling effects were manifested for two of the dependent variables – perceived effectiveness and attitude toward government. The means for these two measures were generally high. This might also help explain the fact that no differences were detected in these two dependent variables across conditions. This ceiling effect could be due to the fact that the base message was too powerful to enable the subtle manipulation of disgust and relevance to make a difference. To better test the theoretical predictions that were examined in this study, researchers should try to design persuasive messages that would not cause unanimously high ratings on persuasive outcomes. An additional limitation concerns the manipulation and the measure of reactance. No significant differences were found across conditions for reactance. However, it is possible that the measure of reactance was not sensitive enough to capture the otherwise significant differences, especially given the way disgust and relevance were manipulated. As a composite of critical thoughts and anger, reactance measure does not differentiate the nature of anger. For instance, participants in the irrelevant disgust condition might have been elicited the same amount of anger as the relevant disgust condition,

but not because of the feeling of being manipulated and threaten for freedom. Instead, their anger might have been due to the fact that they were not happy about being scared by a random picture that has absolutely nothing to do with the message topic. This type of anger is different from the anger that indicates reactance. Researchers should assess the nature of anger in different experimental conditions to avoid equating anger experiences that are aroused by different reasons.

Conclusion

Although threat appeals may be intended to evoke fear, there is good evidence that such messages may also arouse disgust. This project was intended to increase our understanding of how these emotions are aroused and what their persuasive impact might be. By manipulating disgust and relevance in a threatening message regarding HPV, this study tested four theoretical positions that shed light on the persuasive impact of disgust. Out of these four perspectives, only one was supported. Consistent with the cognitive overload position, co-activation of disgust and fear impaired message retention. No other attitudinal or behavioral difference was detected. In addition, the data illustrated the complexity of multi-emotion messages. Overall, the results underscore the need for further research on relationships among disgust, message retention, reactance, and attitudinal and behavioral changes.

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Appendix A: Stimuli

Base Message – The Threatening Message

Slide #1 & 2



ABOUT US RESEARCH GRANTS & TRAINING NEWS & EVENTS search

What is HPV?

HPV is short for human papillomavirus – a group of more than 150 related viruses that can cause infections in human tissues and organs.

Does HPV Cause Health Problems?

Although HPV often goes away on its own, certain types can cause enduring problems including skin warts and cancer.



ABOUT US RESEARCH GRANTS & TRAINING NEWS & EVENTS search

Warts Caused by HPV Infection

Warts usually appear as a small bump or group of bumps on or around the genitals, anus, mouth, or throat. They can be small or large, raised or flat, or shaped like a cauliflower.



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FOLLOW US CONTACT INFORMATION MORE INFORMATION POLICIES

Pop-up Window for Condition 1 (Fear + Relevant Disgust)



ABOUT US

Warts


Warts u
genitals
shaped



STAY AWAY FROM HPV. AVOID GETTING WARTS!

FOLLOW US CONTACT INFORMATION MORE INFORMATION POLICIES

Pop-up Window for Condition 2 (Fear + Irrelevant Disgust)




ABOUT US

Warts

Warts u
genitals
shaped

GET A PLUMBER. DON'T DO IT YOURSELF!



FOLLOW US CONTACT INFORMATION MORE INFORMATION POLICIES

Pop-up Window for Condition 3 (Fear + Relevant non-Disgust)



Pop-up Window for Condition 4 (Fear + Irrelevant non-Disgust)



Pop-up Window for Condition 5 (Fear only)



Slide #3 & 4

HEALTH FOR LIFE

ABOUT US RESEARCH GRANTS & TRAINING NEWS & EVENTS search

Cancers Caused by HPV Infection

HPV is responsible for

91% of cervical cancers,

91% of anal cancers, 75% of vaginal cancers, and

69% of vulva cancers.

Cancer Type	HPV-caused	Others
Cervical Cancer	~11,000	~1,000
Anal Cancer	~6,000	~1,000
Vaginal Cancer	~2,000	~1,000
Vulva Cancer	~4,000	~1,000

Are You at Risk?

27,000 people get cancer caused by HPV each year in the United States

That's **1 person** every **20 minutes**

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Slide #5 & 6

HEALTH FOR LIFE

ABOUT US RESEARCH GRANTS & TRAINING NEWS & EVENTS search

How Do People Get HPV?

HPV is transmitted through intimate skin-to-skin contact. Anal, vaginal, or oral sex can spread HPV, even when the infected person has no visible signs or symptoms.

Could You Be at Risk?

HPV is so common that nearly all sexually active men and women get it at some point in their lives, even if they have had sex with only one person.

ONE IN FOUR AMERICANS ARE HPV INFECTED

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FOLLOW US CONTACT INFORMATION MORE INFORMATION POLICIES

Slide #7 & 8

HEALTH FOR LIFE

ABOUT US RESEARCH GRANTS & TRAINING NEWS & EVENTS search

What Can You Do to Reduce Your Risk of HPV Infections?

- ❖ You can protect yourself against HPV by preventing it before it occurs.
- ❖ Vaccines are available that will protect you against HPV-induced cancers and warts.
- ❖ CDC recommends young women get HPV vaccine through age 26.

How Effective are HPV Vaccines?

- ❖ HPV vaccines are highly effective in preventing HPV infections and warts.
- ❖ The vaccines prevent approximately 90% of cervical, vulvar, vaginal, and anal cancers caused by the most common types of HPV.
- ❖ For individuals who have been exposed to HPV, vaccines can still provide protection against future infection.

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FOLLOW US CONTACT INFORMATION MORE INFORMATION POLICIES

Slide #9 & 10

HEALTH FOR LIFE

ABOUT US RESEARCH GRANTS & TRAINING NEWS & EVENTS search

AA [social icons]

How Safe are HPV Vaccines?

HPV vaccines do not cause any serious side effects. However, HPV vaccines are not recommended for pregnant women.

How Do You Get the Vaccine?

- ❖ **How many shots?** HPV vaccines are given in 3 shots over 6 months.
- ❖ **How much does it cost?** The retail price of the vaccines is approximately \$160 per dose.

1ST DOSE at the appointed date **2ND DOSE** 2 months after 1st dose **3RD DOSE** 6 months after 1st dose

FOLLOW US CONTACT INFORMATION MORE INFORMATION POLICIES

Slide #11 & 12

HEALTH FOR LIFE

ABOUT US RESEARCH GRANTS & TRAINING NEWS & EVENTS search

AA [social icons]

Some Facts about HPV Vaccines

- ❖ **Is HPV Vaccine Covered by Insurance Plans?**
Most private insurance plans cover HPV vaccination. Contact your insurance company for more information.
- ❖ **What if I Don't Have Health Insurance?**
The vaccine manufacturers also offer help for people who cannot afford HPV vaccination. More information can be found on the next page.

What if I Don't Have Health Insurance?

- ❖ GSK provides it free to women who do not have insurance and who have a low income, and who are ages 19 to 25.
<http://www.GSK-VAP.com> [Exit Disclaimer](#)
- ❖ Merck provides it free to women over 19 who do not have health insurance or cannot afford to pay for the vaccine.
<http://www.merck.com/merckhelps/vaccines/Exit> [Disclaimer](#)

FOLLOW US CONTACT INFORMATION MORE INFORMATION POLICIES

Slide #13

HEALTH FOR LIFE

ABOUT US RESEARCH GRANTS & TRAINING NEWS & EVENTS search

AA [social icons]

Talk to a Doctor, Get a Vaccine




HPV VACCINE
IS CANCER PREVENTION

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Appendix B: Measurement Instrument

Note: Unless otherwise noted, the measures will use a 7-point Likert scale with response options ranging from strongly disagree (1) to strongly agree (7).

Screening and Demographic Questions

What is your age in years?

- Younger than 18
- 18
- 19
- 20
- 21
- 22
- 23
- 24
- 25
- 26
- Older than 26

What is your gender?

- Male
- Female

Have you been vaccinated against HPV?

- Yes
- No
- Not sure

Which of the following categories do you identify with? Check all that apply to you.

- White
- Hispanic / Latino
- Black / African American
- Native American / American Indian
- Asian / Pacific Islander
- Other

Emotions (Dillard & Anderson, 2004; Dillard & Peck, 2000; Dillard & Shen, 2005; Nabi, 2002)

Please tell us how you feel right now.

For each of the words below, please mark the response that best represents how you feel right now.

Note. A 5-point scale was used with 1 = None of this feeling, 5 = A great amount of this feeling.

- Scared

- Afraid
- Grossed out
- Sickened
- Irritated
- Annoyed
- Happy
- Cheerful

Thought-listing

We are now interested in everything that went through your mind when you were reading the HPV message. Please list your thoughts, using one box for each thought (we have one additional box if you have more than five thoughts), whether they were about yourself, the situation, and/or others; whether they were positive, neutral, and/or negative. Don't worry about spelling, grammar, or punctuation. You will have 2 minutes to write. Your responses will be anonymous.

Note: After 2 minutes, the arrow key to proceed in the survey will become active and you can click on it.

Perceived Severity

Please indicate your level of disagreement or agreement using the scale below by selecting the appropriate response for each statement.

- I believe there are severe health risks associated with HPV infection.
- HPV infection has serious negative consequences.
- HPV can be extremely harmful.

Perceived Effectiveness (Dillard & Ye, 2008)

Overall, the message you just viewed was ...

- Not at all persuasive 1 2 3 4 5 6 7 Very persuasive
- Not at all effective 1 2 3 4 5 6 7 Very effective
- Not at all convincing 1 2 3 4 5 6 7 Very convincing

Intention

What is the likelihood that you will take each of the following actions at some time in the future?

- 0% - 100% (an 11-point scale)

Attitudes toward Government's Support on HPV

Please indicate your level of disagreement or agreement using the scale below by selecting the appropriate response.

- More resources should be put into the research about HPV and HPV related cancers.
- The government should educate the public regarding the benefits of HPV vaccination.
- HPV vaccines should be covered in the health insurance by insurance companies.
- The government should provide funding to cover the costs of HPV vaccines.

Memory (adapted from Shapiro & Fox, 2002)

Below is a list of statements that may or may not from the HPV screenshots/message you read earlier in this study. Please indicate whether you believe each statement is from the message you just read. (1= Yes, I read this in the message, 2 = No, I didn't read this in the message)

- Although HPV often goes away on its own, certain HPV types can cause health problems including skin warts and cancer.
- One in four Americans are infected with HPV.
- For individuals who have been exposed to HPV, vaccines can still provide protection against future infection.
- Most private insurance plans cover HPV vaccination.
- In addition to cervical cancer, HPV can also cause other types of anogenital cancer, head and neck cancers.
- Before HPV vaccines were introduced, 340,000 to 360,000 women and men were affected by genital warts caused by HPV every year.
- In developed countries, programs are in place which enable women to get screened for HPV infection.
- Medicaid covers HPV vaccination in accordance with the ACIP recommendations.
- HPV is responsible for 91% of cervical cancers, 91% of anal cancers, 75% of vaginal cancers, and 69% of vulva cancers.
- HPV is transmitted through intimate skin-to-skin contact.
- CDC recommend young women get HPV vaccine through age 26.
- HPV vaccines are given in 3 shots over 6 months.
- High-risk HPV types cause approximately 5% of all cancers worldwide.
- Although HPV is the most common sexually transmitted infection, HPV-related cancers are not common in men.
- In the four years after the vaccine was recommended in 2006, the number of HPV infections in teen girls decreased by 56%.
- The federal Vaccines for Children Program provides immunization services for children 18 and under.

Relevance

Did you see a pop-up window when we showed you the screenshots of the website?

- 1 = Yes, 2 = No

What was that pop-up window about? What was the content?

Note. This is an open-ended question.

The content (image and texts) in that pop-up window is _____ to the HPV message in the screenshots.

- Not at all relevant 1 2 3 4 5 6 7 Extremely relevant

Family HPV History

Do you have any family members who are/were infected with HPV?

- 1 = Yes, 2 = No, 3 = Not sure

Friends HPV History

Do you have any friends who are/were infected with HPV?

- 1 = Yes, 2 = No, 3 = Not sure

Appendix C: Pretest Results

Table 1. *Means and Standard Deviations of Disgust Ratings from Pretest*

	Mean	SD
Fear + relevant disgust condition		
Genital warts	2.71	1.44
Hand warts	2.98	1.20
Finger warts	2.81	1.28
Mouth warts	3.08	1.19
Fear + irrelevant disgust condition		
Mouse in bread	3.52	0.97
Hand in toilet	3.66	0.58
Mouse in toilet	3.37	0.82
Clogged toilet	3.64	0.64
Fear + relevant non-disgust condition		
Hand with syringe	0.80	1.18
HPV book	0.38	0.74
Doctor gown with HPV	0.16	0.42
NCI HPV promotion	0.33	0.64
Fear + irrelevant non-disgust condition		
Water pouring	0.04	0.23
Battery recycling	0.04	0.23
Bottles recycling 1	0.15	0.47
Bottles recycling 2	0.16	0.47

Note. $N = 46$. Four images for each of the four experimental conditions were pretested. Respondents viewed all the sixteen images with a randomized order of presentation. Disgust was measured on a 5-point scale with 0 = *none of this feeling* and 4 = *a great deal of this feeling*.

Table 2. *Means and Standard Deviations of Relevance Ratings from Pretest*

	Mean	SD
Fear + relevant disgust condition		
Genital warts	6.03	1.42
Hand warts	6.31	0.96
Finger warts	6.17	1.17
Mouth warts	6.60	0.81
Fear + irrelevant disgust condition		
Mouse in bread	1.94	1.59
Hand in toilet	2.11	1.83
Mouse in toilet	1.51	0.95
Clogged toilet	2.11	1.74
Fear + relevant non-disgust condition		
Hand with syringe	5.94	1.23
HPV book	4.91	2.16
Doctor gown with HPV	6.20	1.28
NCI HPV promotion	6.29	1.30
Fear + irrelevant non-disgust condition		
Water pouring	1.86	1.40
Battery recycling	1.31	0.87
Bottles recycling 1	1.20	0.58
Bottles recycling 2	1.27	0.56

Note. $N = 35$. Four images for each of the four experimental conditions were pretested. Respondents viewed all the sixteen images with a randomized order of presentation. Relevance was measured on a 7-point semantic differential scale with 1 = *not at all relevant* and 7 = *extremely relevant*.

Appendix D. Codebook for Coding the Thoughts

Coding Thought Units

A thought unit is “the minimum meaningful utterance having a beginning and an end. It is typically operationalized as a simple sentence or independent clause in which the subject and predicate may be expressed or implied” (Hatfield & Weider-Hatfield, 1978, p. 46). Put differently, a thought unit is an idea that stands alone. The following rules are to be used as a starting point for your coding of thought units. You may find that you need additional rules or that some of these don’t apply.

1. Sometimes an utterance will consist of only one clause.

He is grateful for what we are doing./

In this case, just put a forward slash at the end of the sentence to indicate that it is to be counted as a thought unit.

2. But a sentence may contain two or more units of this kind.

He was scheduled to go to the calisthenics class./ This raised the questions of gym equipment,/ as he would need money for this./

3. When breaking sentences up into thought units, it is often necessary to supply missing words.

He is more comfortable/ (and he is) happier away from them, too./

Just for purpose of consistency, always put the conjunction with the second clause, not the first (as above).

4. The general sense of the utterance in the context of the sentence or conversation is a good guideline as to whether to separate compound predicates. In the example below “bread and milk” go together because they are both found at the store. “The movies” is a different destination and conceptually unrelated to the first clause. Therefore,

I went to the store for bread and milk/ and to the movies./

5. Sometimes you will have to infer more than conjunctions. The utterance above is another example of having to fill in words. The sentence really means:

I went to the store for bread and milk/ and (I went) to the movies./

6. You should separate dependent clauses such as gerund phrases, adverbial clauses containing because, if, when, and prepositional clauses, and all phrases with direct objects.

Whenever people can’t get through,/ they feel terrible frustration./

I was hungry/because I hadn't eaten all day./
I will return,/ if you will wait for me./

7. Phrases/words that call attention to the speaker or to establish a turn are divided from previous and subsequent thought units.

Listen,/ let's get back to work./

Tell you what,/ you wash the dishes/ and I'll vacuum./

8. Code one word replies as independent thought units.

Yeah./

Okay,/ I will do it./

Right,/ gotcha./

9. When several "okays," "you know"s, or "yeahs" occur consecutively, they should be treated as one unit.

10. If a parenthetical clause can stand alone without distorting the meaning of the sentence, then code it as a separate unit. Thus,

Dr. Fritz, who was trained at the University of Indiana,/ feels that the evidence is compelling./

11. Code hesitations and nonfluencies as one unit.

Uh, yeah, well,/ then I guess I will do it.

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Emotion Words List

1. Love

Adoration, affection, love, fondness, liking, attraction, caring, tenderness, compassion, sentimentality

Arousal, desire, lust, passion, infatuation

Longing

2. Joy

Amusement, bliss, cheerfulness, gaiety, glee, jolliness, joviality, joy, delight, enjoyment, gladness, happiness, jubilation, elation, satisfaction, ecstasy, euphoria

Enthusiasm, zeal, zest, excitement, thrill, exhilaration

Contentment, pleasure

Pride, triumph

Eagerness, hope, optimism

Enthrallment, rapture

Relief

3. Surprise

Amazement, surprise, astonishment

4. Anger

Aggravation, irritation, agitation, annoyance, grouchiness, grumpiness

Exasperation, frustration

Anger, rage, outrage, fury, wrath, hostility, ferocity, bitterness, hate, loathing, scorn, spite, vengefulness, dislike, resentment

Disgust, revulsion, contempt

Envy, jealousy

Torment

5. Sadness

Agony, suffering, hurt, anguish

Depression, despair, hopelessness, gloom, glumness, sadness, unhappiness, grief, sorrow, woe, misery, melancholy

Dismay, disappointment, displeasure

Guilt, shame, regret, remorse

Alienation, isolation, neglect, loneliness, rejection, homesickness, defeat, dejection, insecurity, embarrassment, humiliation, insult

Pity, sympathy

6. Fear

Alarm, shock, fear, fright, horror, terror, panic, hysteria, mortification

Anxiety, nervousness, tenseness, uneasiness, apprehension, worry, distress, dread

Rules for Coding Message-relevant Cognitive Responses

Types of Codes

There are only three types of codes. They are:

1 = Critical/Counterarguments: Any thought that represents a negative evaluation of the message, the advocacy, or the source of the message.

Example: "What a stupid idea."

2 = Neutral: Thoughts that lack any evaluative aspect. Often such thoughts describe some aspect of the message.

Example: "The speaker was wearing a red shirt."

3 = Favorable/Supporting Arguments: Any thought that represents a positive evaluation of the message, the advocacy, or the source of the message.

Example: "The message makes an excellent point."

The Default Code: Neutral

Begin with the assumption that a response is neutral. There are many reasons to move a response out of this category, but if you can't apply one or more of the reasons discussed below, then the response should remain in the neutral category.

The Evaluation Rule

Some responses are clearly evaluative and therefore easy to recognize as Critical or Supporting. But, there are many different aspects to the message with which a respondent could show disagreement or agreement.

Critical/Counterarguments

Example: "I didn't like the main character at all." (Source-Oriented Disagreement)

Example: "I just tune out messages on this topic." (Topic-Oriented Disagreement)

Example: "I watch TV to relax." (Advocacy-Oriented Disagreement [for a PSA that advocate watching less TV])

Favorable/Supporting Arguments

Example: "The PSA makes a strong case for not drinking." (Argument-Oriented Agreement)

Example: "Great background music!" (Delivery-Oriented Agreement)

Example: "What a nice family." (Character-Oriented Agreement)

The Impact Rule

Generally, responses that indicate that the message had an impact on the participant can be coded as Supporting. Of course, the impact should be congruent with the advocacy of the message.

If a subject indicates that s/he learned something that is relevant to the advocacy of the message, the unit should be coded as Agreement.

Example: "I never knew that tobacco companies target kids like that."

Example: "[I] Found out that television is addictive."

Bear in mind that learning just anything from the message does not qualify. Rather, whatever learning takes place should be relevant to the persuasive intent of the message. In other words, learning incidental facts is insufficient to earn an Agreement code. The examples below don't meet this criterion and would be coded as Neutral.

Example: "I never knew that Teddy Roosevelt dressed like that." (from a PSA advocating that individuals visit a website for the Library of Congress)

Example: "[I] Found out that pregnant women have ice cream cravings." (from a PSA advocating the use of seat belts in which a man leaves the house to get ice cream for his pregnant wife)

Also, just knowing something is not sufficient to count as an Agreement. The example below would be coded Neutral.

Example: "I knew what it was for."

Message impact can somewhat diffuse too. For instance, when someone says that "The people seemed sad and lonely" about an anti-TV PSA that depicts viewers as zombies that thought should be coded as Agreement because it is that is the perception that the message was trying to create. An important aspect of this example is that the response is negative (i.e., sad/lonely). Yet, because it is congruent with the aim of the message it reflects the intended impact.

Instances in which participants express comprehension problems (the inverse of learning) should be coded as Critical.

Example: "What is this message for?"

The Identification Rule

Expressions that show identification with the message or the people in the message are coded as Supporting. However, such expressions must meet two additional criteria:

1. The response must indicate that the respondent, him or herself, identifies with the message. Friends and relatives don't count. Thus, the first example below would be coded as Supporting whereas the second would not.

Example: "I pictured myself in her shoes."

Example: "My father smokes." (from a PSA urging people to quit smoking)

2. The unit must show identification with the main idea of the message or the advocacy. If the identification is too far afield or is trivial vis a vis the thrust of the persuasive message, then it should be coded Neutral. The first example below would be coded as Supporting whereas the second would not.

Example: "I thought of my home videos" (from a PSA on drunk driving that uses home video footage of people who later died in a car accident after drinking).

Lack of identification should be coded as Critical.

Example: "I felt it didn't apply to me."

Ambiguously-Valenced Words

Respondents often provide one word responses that are difficult to evaluate because the words have more than one meaning. For example, "Graphic" might mean that message was too graphic (i.e., a negative evaluation) or it might mean that the message had substantial impact (i.e., a positive evaluation). Another example is "Careful." Because we can't know the intention of the respondent in such cases, you should use the default code (i.e., neutral).

The Question Rule(s)

It is not uncommon for participants to express themselves in questions. In general, we must assume that they are wondering about some factual issue and, therefore, should code them as Neutral.

Example: “What was that thing on her forehead?” (from a PSA that shows TV viewers with product codes on their foreheads)

However, there are some exceptions to this general rule and rhetorical questions is one.

Sometimes we see rhetorical questions used to express contempt toward the message or the advocacy. Thus, they should be coded as Disagreement.

Example: “What was the point of this message?”

Example: “Why watch less TV?” (from a PSA that advocates watching less TV)

In other instances, respondents use rhetorical questions to express disbelief that anyone would not agree with advocacy. These should be coded as Supporting.

Example: “Why would you not wear your seat belt?” (from a PSA that advocates using seatbelts)

Example: “Doesn’t everybody realize that cigarettes kill?” (from an anti-smoking PSA)

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