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NEWS MEDIA, INDIVIDUAL-LEVEL TRAITS, AND BEHAVIOR CHANGE IN
FEAR APPEAL RESEARCH

By

Brad Love

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ABSTRACT

NEWS MEDIA, INDIVIDUAL-LEVEL TRAITS, AND BEHAVIOR CHANGE IN FEAR APPEAL RESEARCH

By

Brad Love

Most explanations of health risks are presented to readers and listeners as "fear appeals," messages that attempt to arouse fear to modify personal behavior. Fear appeals persuade by implying or stating that not following some suggested behavior will lead to a negative outcome. Individuals do not make decisions on an entirely rational basis so using emotions to get attention can improve exposure to essential information and then lead to behavior change in many cases.

Not every fear appeal is successful, of course. Exactly what makes for effective use of fear appeals and what leads to failure has been the debate of much scholarly effort during the last five decades. The resulting data offer few well-supported conclusions, despite the volume of research in fields from communication to environmental science.

The central goal of this dissertation is to build upon earlier studies to develop a more accurate model to predict how individuals understand fear appeals. The research seeks to add to prior work by examining other variables that can influence individuals' reactions to fear-arousing messages and to improve on the scientific rigor used in fear appeal experiments. In addition, this research will include a new message context by employing newspaper articles as the delivery medium.

More technically, it extends the EPPM/RPA focus on perceived risk and efficacy by adding three variables from persuasion research: outcome-relevant involvement, need for

cognition, and sensation seeking. Outcome-relevant involvement examines how much a person focuses on the consequences of an issue. Need for cognition measures the degree to which individuals put forth mental effort when considering topics. Sensation seeking assesses an individual's need for stimulating new experiences.

More effective survey measurement instruments will avoid some pitfalls common to prior fear appeal research. Lastly, looking at mass media editorial content will expand the scope of fear appeal experiments into a new area.

An online experiment was conducted with 1105 individuals who each read one of five fabricated news article intended to provide a certain level of perceived threat and perceived efficacy. In addition, respondents completed survey instruments to measure the presence of certain psychological traits commonly used in persuasion research.

Data indicate that perceived threat was a solid predictor of outcome-relevant involvement, which in turn was a predictor of positive behavioral intention. Need for cognition was a significant moderator between message content and perceived threat. Sensation seeking, however, was not a significant predictor, contrary to the hypothesis.

Within the context of this experiment, fear appeal and efficacy messages included in mass media content seem to be effective means to altering individual behavioral intentions. Individual-level considerations are also worth considering when media are presented in a context that allows for personalized customization. The importance of customization will grow increasingly obvious as digital media continue to become more widespread.

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Chapter 1. Introduction

Most explanations of health risks are presented to readers and listeners as "fear appeals" (Witte, Meyer, & Martell, 2001), messages that attempt to arouse fear to get individuals to behave a certain way. Whether in conversation or a magazine article, fear appeals persuade by implying or stating that not following some suggested behavior will lead to a negative situation such as injury, death, financial loss, or embarrassment. The goal of a fear appeal is to initially appeal to emotions rather than logic in getting people to modify their behavior.

The objective of this dissertation is to improve upon existing research and more accurately predict how individuals react to fear appeal messages. This project will extend prior work in three major ways: first, by incorporating other variables expected to influence individuals' reactions to fear-arousing messages; second, by increasing the scientific rigor used in experimental design and measurement; and third, by offering newspaper articles as an additional context for fear appeal research.

Fear-appeal proponents argue that most "logical and reasoned messages fall on deaf ears" (Witte et al., 2001, p. 1), presumably because individuals do not make decisions on an entirely rational basis. Using emotions to get attention, however, can improve exposure to essential information and then lead to behavior change in many cases. The obvious idea behind this is that a fear appeal promises a negative outcome for not completing a certain behavior, and because the listener does not want to experience the negative outcome, that person will then be more likely to follow the suggestion included the fear appeal message.

One of the reviews of fear appeal research by Boster and Mongeau (1984)[1] explicitly explains the structure of a fear appeal argument. By their definition, a fear appeal argument contains four parts that build upon each other:

1) A statement saying that the reader is vulnerable to a threat.

2) Since the reader is vulnerable, that person should take action to reduce the vulnerability.

3) The process of becoming less vulnerable includes the reader accepting the recommendations in the message.

4) Therefore, the reader should accept the recommendations in this message.

An illustration would look something like this:

1) If your car's brakes fail, you will die in an accident.

2) Since you do not want to die, you should do something to prevent your car's brakes from failing.

3) The only effective action is to have the brakes checked by a mechanic.

4) Therefore, you should visit an auto mechanic.

At its simplest, however, any fear appeal contains two basic components, a threat and a suggested response (Witte et al., 2001). The threat describes some negative consequences and the response specifies a way to avoid the threat. These types of arguments can be found in numerous places, from parents talking to children ("You're grounded if you don't clean your room.") to doctors talking to patients ("If you don't lose weight, you'll have a   heart attack.") (Witte et al., 2001). Political and product

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[1] Boster and Mongeau also explain the propositional logic behind this definition, while pointing out that even though the validity of this form is easily demonstrated, the effectiveness of any fear appeal additionally rests upon the quality of evidence supporting that appeal.

advertising are also rife with examples. Candidates often make claims such as, "The economy will fail and you'll lose your job if you vote for my opponent."

In the product advertising realm, a prime example of an appeal to fear is the "real stories" ad campaign for OnStar, the telematics service owned by General Motors. The OnStar service combines a hands-free cell phone built into the vehicle, a global positioning system, and an emergency call center (Fahey, 2003). Pushing the OnStar button on the rearview mirror connects the driver with an OnStar call center employee who establishes the vehicle's location and appropriate services to aid the driver, whether that means an ambulance or driving directions. The service can also connect with the vehicle's engine-control computer to check for problems and use the GPS system to locate stolen cars.

Beginning in 2002, OnStar's radio advertising started integrating real calls from traumatized drivers to promote the safety uses of this technology. A year later, the company purchased time on cable networks such as Home & Garden TV, the Food Network, and The Learning Channel to air 30-minute, documentary-style TV commercials featuring "teary, thankful women recounting frights; black-and-white, *Cops*-like re-creations of trauma scenes; interviews with trauma surgeons; and references to the inadequacy of cell phones" (Fahey, 2003).

One commercial features the testimony of Geraldine Felax of Rogers City, Mich. "Without the OnStar I would have never received the help in time," she said of an incident that involved her husband being trapped underneath a tractor. "There's no way he would have made it."

The implications follow the format laid out by Boster and Mongeau (1984):

1) OnStar is encouraging people to feel vulnerable to accidents and other threatening situations.

2) Since individuals are vulnerable to these situations, they must do something to prepare.

3) To protect themselves and their families, the most effective option is a subscription to OnStar.

4) Therefore, people that truly care for their loved ones should subscribe to OnStar.

More simply, the ads use the threat of an accident to suggest an OnStar subscription as the most effective response. The campaign is promoting fear of an accident to imply that individuals without OnStar subscriptions are not doing all they can to protect their loved ones—and it is working. In the first year of the ad campaign, 3,000 subscribers a month joined the service, according to OnStar (Fahey, 2003). Admittedly, this is also in conjunction with other sales techniques such as rebates and free initial memberships, but the ads are doing enough to drive consumer interest.

Not every fear appeal is successful, of course. Many individuals will fail to follow the path outlined above. Exactly what makes for effective use of fear appeals and what leads to failure has been the debate of much scholarly effort during the last five decades. The resulting data offer few well-supported conclusions despite the volume of work dedicated to fear appeal research (LaTour, Snipes, & Bliss, 1996). Fields from communication to environmental science have put resources into the study of fear appeals. The results of these projects, however, have not always produced the predicted or desired outcomes. To explain these varying outcomes, researchers have moved through a number of phases and corresponding models, each predicting a different mental processing path and outcome

for fear appeal messages (Boster & Mongeau, 1984; Witte & Allen, 2000). A pair of effects have been consistent and reported regularly, though, even if they're not found in every single study (Sutton, 1982)—perceived fear and perceived efficacy both influence behavioral intention.

The first such effect is a consistent connection between perceived fear (or perceived threat) and following the recommended actions (Beck & Davis, 1978; Boster & Mongeau, 1984; Sutton, 1982; Witte & Allen, 2000). Perceived fear is the emotional reaction to an individual's belief that a particular danger or harm is a possibility in that person's life. The issue causing the fear may be real or imagined, but it exists in the individual's head and influences actions. Researchers measure perceived fear through two dimensions: perceived susceptibility and perceived severity. Perceived susceptibility covers the perception of the likelihood of experiencing the problem causing the fear. Perceived severity concerns beliefs about the scale of the problem (Witte et al., 2001). In the case of the OnStar commercials, perceived susceptibility would be the likelihood of an accident or some other situation requiring an emergency response. Perceived severity would involve the seriousness of the outcome of the situation, such as an injury or death.

The second effect found regularly in fear appeal studies is a link between perceived efficacy and adherence to the suggested actions (Witte & Allen, 2000). In general, perceived efficacy is found to have stronger links to following the message's suggestions than perceived risk. Perceived efficacy refers to the perceived effectiveness of a prescribed action and a person's ability to complete it. Like perceived risk, researchers measure it through two dimensions, response efficacy and self-efficacy (Witte et al., 2001). Response efficacy concerns perceptions of the effectiveness of the action

*promot*ed by the message. Self-efficacy covers individuals' beliefs about their ability to *comple*te the proscribed response. Again, for the OnStar advertising, response efficacy *would* concern the ability of OnStar to protect people from accidents or negative *outcome*s. Self-efficacy would be about individuals' ability to use the OnStar system or to *mai*ntain a consistent subscription.

Considering this, current models predicting the outcomes of fear appeals have worked to *incl*ude both perceived risk and efficacy. In addition, these models have examined *research* from other fields and incorporated additional constructs to better predict *outcome*s from fear-inducing messages. Along with adding new ideas, current research *has also* attempted to improve the quality of experiments by doing a better job of *inducing* a frightened reaction with the messages and then measuring their reactions to *the situation*.

Two examples of adding ideas are Witte's Extended Parallel Process Model (EPPM) *(Witte*, 1992b) and the Risk Perception Attitude (RPA) framework developed by Rimal *and* Real (2003). Both work to improve the theoretical understanding of how fear appeals *influence* behavior. The Extended Parallel Process Model advances fear appeals research *in a* number of ways. Primarily, it works to explain what makes fear appeals fail to *produce* the desired effect, which is the most common result of such messages and *experiments*. The Risk Perception Attitude framework, on the other hand, continues with *the* EPPM's basic ideas and makes progress by better measuring what is happening when *people* are exposed to fear appeal messages. Most prior research compared the strength of *the* fear appeal in the message to the likelihood of following the recommended action. *The* RPA instead takes the logical step of comparing the individuals' reactions to the

message with the likelihood of following the recommended action, putting the entire *focus* on thought processes instead of external stimuli. Where the EPPM considers the content of the treatment messages, the RPA considers how individuals react to those treatment messages.

In addition, the RPA's developers examine how other personality traits influence peoples' reactions to fear appeals, allowing for more precise predictions of the effectiveness of fear appeals. For example, the way individuals acquire new knowledge and their motivation to protect themselves from negative situations are two elements the RPA introduced to fear appeal research.

Such changes follow the general outline advocated by the authors of several reviews of fear appeal research (Boster & Mongeau, 1984; Witte & Allen, 2000). Understanding how other traits influence the effectiveness of these messages may explain the weak—though consistent—links that perceived risk and perceived efficacy have with adherence to message-suggested behaviors. The discovery of such relationships could serve to forecast the likelihood of positive outcomes from campaigns featuring fear-arousing messages.

Fear appeal research could also benefit from an expansion in terms of the type of media content used in experiments. It has focused to date almost exclusively on educational materials—brochures, posters, and videos—designed to communicate health information. The usage of mainstream-media editorial content such as newspaper articles or TV news stories has been rare—if not nonexistent—despite the fact that news content often serves a key information-providing purpose (DeJong & Winsten, 1990) in providing the daily narrative for society (Nell, 2002; Y. J. Park, 2005). Sensationalism

remains a common feature in some content as news organizations feel compelled to arouse emotions to attract a maximum amount of attention (Grabe, Zhou, Lang, & Bolls, 2000; Hofstetter & Dozier, 1986; R. Jung, 1982). As such, fear appeal research fails to address what may be the most common source of fear appeals.

Identification of researchable problem

Although prior studies offer valuable building blocks for fear appeal research, much work remains. The data often fail to match researchers' predictions, nor do those data do much to clarify the ways in which individuals process fear appeals. The central goal of this dissertation is to build upon knowledge from earlier studies to develop a more accurate model to predict how individuals from the general population understand fear appeals. The dissertation's goal is being approached in three main ways. The research seeks to add to the information acquired through prior work by examining other variables that can influence individuals' reactions to fear-arousing messages and to improve on the scientific rigor used in fear appeal experiments. In addition, this research will also include a new message context by employing newspaper articles as the medium displaying fear-arousing messages.

More specifically, this research extends the EPPM/RPA focus on perceived risk and efficacy by adding three variables from other persuasion research: outcome-relevant involvement, need for cognition, and sensation seeking. Outcome-relevant involvement examines how much a person focuses on the potential consequences of a particular issue. Need for cognition measures the degree to which individuals like to put forth mental effort when considering topics. Sensation seeking assesses an individual's need for stimulating new experiences.

More effective survey measurement instruments will improve the accuracy of the experimental results and avoid some pitfalls common to prior fear appeal research. Lastly, looking at mass media editorial content will expand the scope of fear appeal experiments into a new area, one that is potentially viewed quite differently by readers. Health education materials such as brochures have an obvious agenda regarding the reader's behavior. Brochures' messages may encounter some resistance because their goal of behavior modification is obvious. Traditional media such as newspapers, on the other hand, do not necessarily share the same biases, as their information is intended to be objective instead of persuasive (Gans, 1985; Kuklinski & Sigelman, 1992; Niven, 2003; Schiller, 1979; Schudson, 2001). Thus, the research being discussed here seeks to improve fear appeal research in three significant and distinct ways, all working to improve the effectiveness and usefulness of a common model.

Rationale and contribution

The following sections will discuss each of the stated goals: 1) to examine individual-level persuasion-related variables; 2) to reduce the impact of poor experimental design and measurement common to prior research; 3) and to open the context of fear appeal research.

Additional variables

Other variables in the present study will come from persuasion research that spans several disciplines. Outcome-relevant involvement will be one addition to the EPPM/RPA framework as a mediator[2] between perceived risk and an intention to change

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[2] A variable functions as mediator when it meets the following criteria: a) the initial variable is correlated with the outcome variable; b) variations in the level of the independent variable significantly account for variations in the presumed mediator; c) variations in the mediator significantly account for variations in the

one's behavior, meaning it controls the relationship as a necessary bridge between the two variables. This individual-level variable measures how readily a respondent considers consequences surrounding a particular issue (Cho & Boster, 2005). For example, high-scorers here generally like to consider the message, seek information on the topic and objectively process the content.

Adding outcome-relevant involvement to the EPPM/RPA framework leads to the prediction that individuals perceiving a high personal risk after reading the fear appeal message will also report high levels of outcome-relevant involvement, leading them to be more likely to respond to the stimulus message in an action-oriented manner. A prior study using educational brochures in a student population found that high involvement individuals were likely to make action-oriented behavior change "and hence were more persuaded by high fear appeal messages than low involvement individuals" (Cheah, 2006, p. 293).

Another addition to the framework will be need for cognition, a psychological variable measuring the degree to which people enjoy and undertake effortful mental activities (Cacioppo, Petty, Feinstein, & Jarvis, 1996). It has been tested in some recent fear appeal research but never in a newspaper environment or in a broad population sample. One study, for example, involved a sample containing only individuals likely to already be in possession of a high motivation to comply with message recommendations

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dependent variable; and d) for complete mediation, when the IV-mediator and the mediator-DV path are controlled, a previously significant relation between the independent and dependent variable is no longer significant (Baron & Kenny, 1986; Brown, 1997).

The result, as Baron and Kenny (1986, p. 1176) write, is that: "In general, a given variable may be said to function as a mediator to the extent that it accounts for the relation between the predictor and the criterion. Mediators explain how external physical events take on internal psychological significance. Whereas moderator variables specify when certain effects will hold, mediators speak to how or why such effects occur."

(Williams-Piehota, Pizarro, Silvera, Mowad, & Salovey, 2006). People scoring high in need for cognition tend to form judgments by examining relevant arguments as opposed to extraneous cues, leading to the expectation that individuals high in need for cognition will perceive their personal risk as higher following the presentation of logical, rational information in the fear appeal. Need for cognition is expected to moderate the relationship between the initial message and the perceived risk that results, meaning that need for cognition will influence the strength of the relationship between the two variables.[3]

Sensation seeking is also expected to play a moderating role between message exposure and perceived risk. This variable focuses on the need for new experiences through often risky behavior, including dangerous activities and non-conventional lifestyles. This variable has been linked with accident involvement and rejection of persuasive messages among young adults (Cameron, Leshner, Stephenson, & Choi, 2006), leading to the expectation that individuals high in sensation seeking will perceive less risk following exposure to the fear appeal message.

Design and measurement improvements

Methodological issues common to fear appeal research include unreliable measurement and a failure to examine the connection between reactions to the experimental message and outcomes. Incomplete, single-item measurement is a feature of

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[3] The seminal work on defining mediators and moderators defines a moderator in the following way: "In general terms, a moderator is a qualitative (e.g., sex, race, class) or quantitative (e.g., level of reward) variable that affects the direction and/or strength of the relation between an independent or predictor variable and a dependent or criterion variable. Specifically within a correlational analysis framework, a moderator is a third variable that affects the zero-order correlation between two other variables. ... In the more familiar analysis of variance (ANOVA) terms, a basic moderator effect can be represented as an interaction between a focal independent variable and a factor that specifies the appropriate conditions for its operation" (Baron & Kenny, 1986, p. 1174).

much fear appeal research, particularly in early studies (Boster & Mongeau, 1984). Recent studies tend to use better measurement but often fail to use the most reliable or discriminant instruments available (Cho & Boster, 2005). While these studies can often still find differences between treatment groups, measuring variables more accurately could offer details that will help design more effective messages in the future.

Other research has linked reactions to experimental messages and outcome variables (LaTour & Rotfield, 1997; Rimal & Real, 2003), but such work is rare and has often focused almost exclusively on unique populations, such as students or individuals living under particular conditions (i.e., areas with high prevalence of HIV/AIDS). While undoubtedly valuable, projects repeatedly focusing on specific populations naturally raise questions about the generalizability of the results.

Fear appeal context

Lastly, this research will include content representing mass media news stories. Prior work almost exclusively used materials affiliated with health campaigns, including posters, brochures, and other advertisements. However, news content plays an essential role in real-life behavior-modification campaigns. In the context of unmatchable corporate advertising budgets, pro-social organizations in particular depend upon editorial content to expand the reach of their campaigns. Through this avenue, many of the same messages that fill paid-for media also enter independently produced news content. In addition, the opening paragraph of much news content uses fear appeals to gain attention for the story as a whole or because the content-producer feels a fear message is the best way to get an audience's attention (Grabe et al., 2000; Hofstetter & Dozier, 1986; R. Jung, 1982).

Importance of the study

The outcome of this project will add to the body of knowledge in several ways. This dissertation will directly test several mediators/moderators that could influence the effectiveness of how fear appeal messages function through the known channels of perceived efficacy and perceived fear. The research here will seek to improve methodology and broaden the scope of fear appeal research. These additions will aid in understanding how outcome-relevant involvement, need for cognition, and sensation seeking influence reactions to fear appeal messages. With this knowledge, content-developers can adjust their messages accordingly to gain the desired effect.

The results should help journalists, public relations professionals, and healthcare practitioners understand how to better develop messages to change health behavior. Knowing how people are likely to respond to behavior-change messages will help those involved with producing media content more effectively target certain populations and individuals. The implications for these findings extend into a number of media-related fields, as well as any other context that involves altering behavior or attitudes through mediated persuasive messages. While previous findings might logically be extended to include mass media editorial content, prior research has done no testing in this direction.

On a related note, understanding the constructs that influence desired outcomes also helps researchers and practitioners understand how people think. This is, of course, practically useful in terms of message design, but it is also beneficial in understanding how individuals process messages. It is possible that the mental processes that go into understanding fear appeals will relate to the processes that help individuals understand other message types as well.

Chapter 2. Literature Review

Fear appeals have not lacked for attention from researchers, and the often conflicting results have produced a complicated body of literature as well as several nuanced meta-analyses. Part of fear appeals' popularity as a research topic (Sussman, 1973) may be due to the seemingly discordant results obtained in different experiments (Boster & Mongeau, 1984; Mongeau, 1998; Sutton, 1982; Witte & Allen, 2000). Some experiments show improved conformity with high fear appeals over low ones (Beck & Davis, 1978); others describe situations where low fear messages were more effective than high (Janis & Feshback, 1954); and yet another group supports the idea that the amount of intended fear in a persuasive message has no bearing on how much a respondent follows the recommendations of a message (Wheatley & Oshikawa, 1970). A fourth option posits that fear appeals interact with other variables, making high-fear messages more effective in some situations and low-fear messages effective in others (Leventhal, 1971). The result of these conflicting ideas has been a confused situation where some public health researchers and practitioners alike argue that fear appeals are counterproductive (Covello, von Winterfeldt, & Slovic, 1986; Finckenauer, 1982; Geller, 1989).

In typical research on fear appeal messages, respondents are exposed to fear appeals manipulated for strength with one message being strong and one weak (Witte & Allen, 2000). The strength of these messages is then verified through a manipulation check to ensure individuals perceive a significant difference between the strong and weak fear appeal. The final measure is to examine whether or not the stronger message results in stronger outcomes than the weak appeal. Some of the confusion in interpreting results is

because certain outcomes are based on individuals accepting message recommendations *and* others come from rejecting the message. One challenge has been developing theories *to* account for and predict both outcomes.

To sort the variety of results, a number of scholars have thoroughly reviewed the literature (Boster & Mongeau, 1984; Mongeau, 1998; Sutton, 1982; Witte & Allen, 2000). Similar efforts have focused on extending existing theory (Rimal & Real, 2003; Witte, 1998), parsing out models (Prentice-Dunn & Rogers, 1986), or adding other emotions to the research (Dillard, 1994). Others have placed the focus on fear appeals within specific contexts such as marketing (Ray & Wilkie, 1970) and public health (Job, 1988). These works have combined with other reviews responsible to shift the focus of fear appeal research to quantitative meta-analyses (Boster & Mongeau, 1984; Mongeau, 1998; Sutton, 1982) following early studies that resembled critical essays concerning conceptual, operational, and methodological issues (Higbee, 1969; Miller, 1963).

Early models

The fear appeal literature reviews each discuss various models outlined by scholars engaged in the effects of fear-arousing messages on persuasion (Boster & Mongeau, 1984; Witte & Allen, 2000). As with any scholarly endeavor, the models have tended to build upon each other and the key theories of the time period (Witte & Allen, 2000). Fear appeal theories have moved through periods of being influenced by learning theories (Hovland, Janis, & Kelly, 1953; McGuire, 1968) to focusing on cognition (R.W. Rogers, 1975) to a more recent trend of examining emotion's role in behavior change (Dillard, 1994; Witte, 1992b). Several common models are discussed below as a summary of the older fear appeal literature. These models include: the drive explanation, the resistance

explanation, the curvilinear hypothesis, the parallel response explanation, and subjective expected utility type models such as the protection motivation explanation and the threat control explanation.

Drive explanation

These early explanations suggest that the effect of persuasive messages is to produce varying amounts of fear in the audience which results in a drive for action (Hovland, Janis, & Kelley, 1953). The messages under study, of course, vary in fear-arousing content, but the expectation is that the level of fear in audience members will correlate positively with the level of fear-arousing content. The result of this is that high fear messages are expected to produce more fear in audience members than moderate or low fear messages. In addition, the production of high amounts of fear in the audience is also expected to influence the audience's view of the issue in question. As perceived fear increases, the audience's attitude will more closely match that recommended in the persuasive message. Boster and Mongeau (1984) strongly point out, however, these correlations are expected to be substantial but not without error.

These relationships stem from a drive-reduction process initiated by the perceived fear aroused by the persuasive message. This perceived fear rooted in the persuasive message creates a state of drive, making audience members uncomfortable and motivating them to take some drive-reducing action. The drive explanation predicts that the audience will change its attitudes or behaviors (or both) to reduce the discordant feeling. There exists any number of possible drive-reducing actions a person could undertake (Boster & Mongeau, 1984).

However, the data fail to support the direct relationship predicted by the drive model. Negative correlations between fear manipulations and attitude (Goldstein, 1959; Janis & Feshback, 1953; Janis & Terwilliger, 1962), negative correlations between fear manipulations and behavior (Janis & Feshback, 1953; Leventhal, Singer, & Jones, 1965; Leventhal & Watts, 1966), zero correlation between fear manipulations and attitude (Kohn, Goodstadt, Cook, Sheppard, & Chan, 1982; Wheatley & Oshikawa, 1970), and evidence hinting that other variables moderate the fear manipulation-attitude correlation all work against the drive explanation as an explanation for the effects of fear appeals (Boster & Mongeau, 1984).

Resistance explanation

This model originally suggested by Janis and Feshbach (1953) takes the opposite approach of a drive explanation, arguing that a strong fear appeal is not effective at influencing the audience in the desired direction because of a process of defensive avoidance (Miller, 1963). A defensive audience attempts to then rebuff the presented threat, minimizing its importance. Of course, as Miller points out (1963), this whole process is moderated by individual personalities and their interest in the communication, along with other factors that influence the relationship with the source.

A low fear message, however, gets through to the audience because the suggestion is heard without interference from defensive avoidance, making low fear messages preferable to high fear ones. Compared to the drive explanation, the resistance explanation poses the opposite relationship between perceived fear and listener response. The resistance explanation predicts a negative correlation between fear arousal and adherence to message suggestions.

As Boster and Mongeau (1984) describe, the resistance explanation is countered by *some* findings, specifically several studies that found a positive correlation between fear manipulations and attitudes (Beck & Davis, 1978; Berkowitz & Cottingham, 1960; Burnett & Oliver, 1979; Frandsen, 1963; Hewgill & Miller, 1965; Horowitz, 1969; Horowitz & Gumenik, 1970; Leventhal et al., 1965; McCroskey & Wright, 1971; Powell & Miller, 1967).

Curvilinear hypothesis

As the name suggests, this hypothesis predicts that high fear and low fear messages will have a similar effect (a weak one in this case), but moderate fear messages will produce a different result (increased attitude/behavior change) (Boster & Mongeau, 1984).[4] The link between perceived fear and the audience's adoption of the suggested response differs from previous models in that this hypothesis posits that a moderate fear message will be more influential than either a high or low fear one. Just as the drive explanation supports high fear messages and the resistance explanation supports low fear messages, the curvilinear hypothesis supports moderate fear messages. It argues that when an individual is extremely afraid or not very afraid, that person will be less likely to follow the recommended action of the communication at hand.

A communication attempt to provoke fear that results in a moderate level of fear, on the other hand, will influence individual behavior as effectively as possible. However, not all versions of this hypothesis offer the same logic that leads to this final outcome, as Boster and Mongeau explain in detail (1984).

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[4] Witte and Allen (2000) place this model in with the drive theories.

The first version of the curvilinear hypothesis comes from Janis (1967) and Janis and Leventhal (1968) when they argued that low perceived fear leads the audience to dismiss the threat and high perceived fear causes defensive maneuvers. Moderate fear, though, stimulates people and puts them in a situation where they are likely to accept the message's recommendations. Janis and Leventhal also recognize that other factors such as individual situations and dispositions influence the relationship between fear appeals and compliance.

McGuire (1968) proposes a different reasoning as to why moderate fear messages are most effective at audience persuasion. His two-factor explanation is the second version of the curvilinear hypothesis (Boster & Mongeau, 1984). McGuire argues that fear plays two roles within a persuasive process, and the two roles mostly serve to cancel each other out. The first role of perceived fear is to act as a drive encouraging an individual to follow the prescriptions of the persuasive message. The second function of perceived fear is as a cue to resist the recommended action; thus, increasing fear increases the likelihood that the audience will refuse to go along with the suggested response. The result of this, according to McGuire (1968), is a curvilinear relationship between anxiety and influenceability that offers maximum susceptibility at intermediate levels of anxiety.

The third version of the curvilinear hypothesis (Boster & Mongeau, 1984) focuses on Higbee's (1970) interpretation that stresses the significance of two variables: severity of the threat and probability the threat will occur without preventative action. Higbee's argument is that as perceived fear increases, perceived severity increases exponentially while perceived probability of the episode decreases exponentially. The severity of the

*thr*eat and the likelihood of it happening absent preventative action are thus negatively *corre*lated, creating a curvilinear function.

These U-shaped models failed to develop a solid foundation of evidence, however, *and* were rejected during the 1970s (Witte & Allen, 2000) due to the lack of strong *evi*d*e*nce for nonlinearity, among other evidence (see Boster & Mongeau, 1984 p. 365). A *num*ber of publications served to point out that the models' central ideas were not *sup*p*o*rted (Beck & Frankel, 1981; Giesen & Hendrick, 1974; Mewborn & Rogers, 1979; R. W. Rogers, 1975; Sutton, 1982) and when curvilinear effects are reported, they are not *as* *pre*dicted by the hypotheses (Powell, 1965). The lack of supporting evidence for *cur*v*i*linear models then helped fear appeal research move from cognitive responses into *the* *e*x*a*mination of emotional ones (Witte & Allen, 2000).

Parallel response explanation

*F*e*ar* control and danger control are the essential elements of the parallel response *ex*p*l*a*n*ation, an attempt by Leventhal (1970, 1971) to incorporate the additional variables *that* *se*veral scholars recognize as influencing attitudes and behaviors (Boster & *M*o*n*geau, 1984). This explanation posits that fear control and danger control result from *fear* appeals as a means of helping the audience members deal with the presented threat. *The* *f*inal attitude will then be a function of the fear and danger control provoked by the *fear-i*nducing message. Leventhal, however, did not actually test the proposed model *(19*7*0)*.

*D*anger control results in an individual taking action to avoid the presented threat. In *this* *c*ontext, it is an action-taking, problem-solving response where the audience member *takes* in information relevant to the threat and deals with the problem at hand. On the

other hand, fear control results in a path focused on lessening the emotional strain *produced* by the fear appeal. Rather than marshaling resources to take action, fear control *puts* the effort into an emotional coping process focused internally rather than on the *threat*. This internal focus can prevent acceptance of the suggested action.

When an individual follows the danger control path, this model predicts that user's attitude will match the one prescribed in the fear appeal message. For those following the fear control path, the model predicts an inverse relationship between the strength of the fear appeal and the resulting attitude. Although he doesn't address the details of the interaction, Leventhal (1970, 1971) states that the two processes interact to produce the resulting individual attitudes with the result being a main effect of a positive correlation between fear appeals and audience adherence to the recommended response.

Sternthal and Craig (1974) also supported the parallel response explanation but posited a different model. They hypothesized a curvilinear relationship between fear level and resulting attitude. As fear increases, both fear and danger control increase, meaning that high levels of fear fail to produce desired outcomes because the processes obstruct each other. Low fear levels also fail to lead to the desired outcomes because both processes are weak and audience members have no reason to accept the suggested action. Moderate levels of fear, however, are most likely to generate the desired outcomes because the danger control process will be relatively strong while the fear control process will be weak.

Others have taken other issues with Leventhal's version of the parallel process explanation. Rogers (1975) argues that the model lacks explicit details about the stimulus variables predicting the fear and danger control processes. Not having specific variables

*pre*vents thorough testing of the model. In addition, the linking statements and constructs *in the* model are so ambiguous, it's not possible to make accurate predictions linking fear *and* persuasion (R.W. Rogers, 1975), making the model untestable (R.W. Rogers, 1975).

The parallel response explanation is valuable because it introduces the constructs of *fear* and danger control, but the ambiguity present in parts makes it otherwise less useful (Boster & Mongeau, 1984). As Boster and Mongeau point out (1984), while this model does predict all possible outcomes of a fear appeal message, it fails to detail when one can expect the various responses, making it unfalsifiable and of little scientific value. Introducing fear and danger control, though, did alter thinking at the time about fear appeals—it separated emotional and cognitive processes (Witte & Allen, 2000).

Subjective expected utility models

Models related to Sutton's SEU predictions posit that individuals examine options and rationally select the one that seems to be meet present needs (Sutton, 1982). Fear plays almost no role in these models (Witte & Allen, 2000). Little evidence supports this idea (Sutton & Eiser, 1984; Sutton & Hallett, 1988), but, ironically, one SEU-based study found that fear produced the most reliable effect on intentions, despite not actually being part of the model (Sutton & Eiser, 1984).

A major challenge with the SEU models is that they assume that individuals will perform a sort of cost/benefit analysis when making decisions. People are expected to be capable of knowing and ranking their preferences, estimating the likelihood of success for those preferences, and then maximizing their choices by balancing a preferred option with probability of success.

Subjective expected utility model: Protection motivation explanation

The first SEU model, protection motivation describes a person's desire to avoid a potential threat. Rogers (1975) posits that this motivation is driven by three factors: magnitude of noxiousness of a happening, probability the happening will occur without some behavioral or attitudinal adaptation, and the availability and effectiveness of a response that could diminish or remove the noxious stimulus. Through these factors, the model tries to logically explain what makes for an effective fear appeal (Witte & Allen, 2000).

Perceptions of these variables combine multiplicatively to create the protection motivation state, provided all three are present to some degree. Of course, the more the message under consideration contains these three factors, the more the audience will perceive them and adjust its attitude, according to Rogers (1975). Thus, the goal for a message designer is then to increase the amount of protection motivation in order to increase audience adoption of the recommended action, accepting some error as usual.

As Boster and Mongeau (1984) describe, however, this model moves through four parts: 1) from the message characteristics 2) to audience perception 3) to protection motivation 4) and finally to attitude. As a result, there are several mediators between the original message and the final attitude, which could result in a rather low correlation between the initial message and resulting attitude. Also, should any correlation among the perceived message characteristics be zero, no protection motivation will be present, and no adoption of message recommendations is expected to take place.

While Rogers did not end up finding support for his hypothesis of a four-way interaction (R.W. Rogers, 1985), other protection motivation studies did find that at least

one threat variable (severity or susceptibility) interacted with at least one efficacy variable (self-efficacy or response efficacy). These interactions then affected message acceptance outcomes (attitude, intention, behavior) (Kleinot & Rogers, 1982; Maddux & Rogers, 1983; Wurtele & Maddux, 1987). However, as a whole, the variables in PMT do not explain when and how fear appeals fail, and the interaction among fear, efficacy, and probability are not the type predicted (Boster & Mongeau, 1984). Witte and Allen (2000) did note, though, the existence of main effects for threat and efficacy on outcomes such that high threat and high efficacy led to more persuasive power. In addition, this model made a significant contribution by moving fear appeal research to measuring respondents' perceived fear in place of the highly arousing, negatively charged emotion fear (Witte, 1998) after fear had remained the focus of research for a little more than 20 years (Witte & Allen, 2000).

Subjective expected utility model: Threat control explanation

The threat control explanation fits in the SEU mold in that it presumes that individuals respond to fear appeals based upon cognitive factors rather than affective ones (Boster & Mongeau, 1984). Models before SEU hypothesized that fear and other factors mediated the link between fear appeals and audience attitudes.

The threat control model depends upon two processes linking the message and threat control: response efficacy and personal efficacy (Beck & Frankel, 1981). Response efficacy consists of an individual's belief that the suggested action will be effective in reducing the likelihood of the threat actually taking place. Personal efficacy is the individual's belief that he or she can successfully complete the recommended action.

As such, the key element of this model is that it does not depend upon fear. Instead, the focus is on presenting a real but controllable threat (Beck & Frankel, 1981). The failure of a message to provoke a certain attitude among an audience stems not from defensive avoidance by that audience but from the use of a threat perceived as uncontrollable.

Because this control issue plays such a significant role, the correlation between perceived threat control and audience adherence to the suggested attitude/behavior is expected to be positive and substantial (Boster & Mongeau, 1984). Beck and Frankel (1981) do not detail how response and personal efficacy combine to create threat control, but the relationship is assumed to be linear.

Like the previous model, however, having mediators (two types of efficacy and then perceived threat control) between the fear appeal and the resulting attitude could result in what appears to be a weak relationship. A particular message may also negatively influence an audience member's personal or response efficacy, resulting in a negative correlation between the initial content and adherence to the message's suggestions (Boster & Mongeau, 1984).

EPPM/RPA

The above fear appeal models and literature, however, mostly fail to examine factors that produce negative outcomes of non-persuasion. That research focuses instead on the desirable, successful outcomes of attitude change, behavioral intentions, and behaviors in the direction of message acceptance (Boster & Mongeau, 1984; Mongeau, 1998; Sutton, 1982). As Witte and Allen (2000) describe in their meta-analysis, defensive, message-resistant responses have not historically been an essential part of the fear-appeal

literature. Often termed "defensive avoidance," "minimization," "denial," or something

similar, these psychological resistance strategies existed in published research under

many different names, though they in fact referred to a reliable single construct (Smalec,

2000; Witte, 1994a).

Witte and Allen (2000) noted that these unattended-to, negative outcomes also offer

valuable information about the effectiveness of fear appeals. As a result, they used their

review to examine the 13 studies as of 2000 that reported the link between fear appeal

strength and defensive responses,[5] finding that resistant responses increased in strength as

the fear appeals did likewise ($r = .195$, $p < .05$). On the other hand, weak efficacy

messages correlated with an increase in defensive responses as well ($r = -.105$, $p < .05$).

The defensive, fear control responses also correlate negatively with the more desirable,

action-oriented, danger control responses ($r = -.18$, $p < .05$).

The Extended Parallel Process Model works to explain these relationships among

efficacy and the fear control/danger control responses. The EPPM builds upon older

models in an attempt to predict both the successes and failures of fear appeals while re-

integrating fear as a central variable (Witte & Allen, 2000). Essentially, three prior

models combine to produce the EPPM: Leventhal's parallel response explanation makes

up the foundation of the model; protection motivation theory handles the danger control

portion to explain when and why fear appeals work; and explanations by Janis and

McGuire serve to detail the fear control side concerning when and why fear appeals fail

(Witte, 1992b, 1998; Witte & Allen, 2000).

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[5] Page 601 in Witte and Allen (2000) lists the individual studies and discusses results.

Fear, of course, is a discordant emotion that individuals naturally strive to eliminate through the most efficient means possible to return to the prior comfortable mental state (J. W. Brehm, 1966; S. S. Brehm & Brehm, 1981). Fear is a motivator in this case. EPPM—following the parallel response literature—predicts that individuals use one of two paths to reduce fear when they perceive a threat: one to control the danger causing the threat, the other to control the fear produced by the threat (Witte, Cameron, McKeon, & Berkowitz, 1996). The first, of course, results in action intended to alleviate the problem, removing the danger. The communicator's goal is to have that action be the recommended responses in the original persuasive message. The second option—fear control—only removes thoughts or recognition of the threat, resulting in a response such as denial or defiance.

According to Witte and Allen (2000), perceived efficacy is the key factor in establishing which path an individual will follow—danger control to remove the threat or fear control to ignore it. Like the available response paths, perceived efficacy is divided into two parts (Witte et al., 1996). The first piece is response efficacy, an individual's belief about the effectiveness of a particular response to the threat at hand. The second element is self-efficacy, an individual's belief in being capable to carry out a particular response to the threat. Thus, the individual is asking if the suggested response is an effective one and if he/she can perform that action.

To get individuals on the danger control track where they take action against a threat, perceived efficacy must be greater than perceived threat. The audience must believe "they are easily, feasibly, and effectively able to avert a serious and relevant threat from occurring by adopting the recommended response" (Witte et al., 1996, p. 318). Reacting

to and feeling a threat (perceived fear) along with an even stronger ability to overcome that threat (perceived efficacy) through the specified action promotes the danger control path. This path is more likely to lead to following the message's proposition of attitude, intention, or actual behavioral change. For example, a university student may feel threatened by a message highlighting the frequency of sexually transmitted infections on the campus but also believe that the suggested precaution of using condoms is both easy to do and capable of preventing these STIs. Thus, the student would be likely to undertake the personally protective behavior because the student perceives the suggested response as manageable and effective, leading to an efficacy component stronger than the fear appeal.

When the efficacy element does not overpower the initial fear appeal, fear control processes take over. Here, individuals opt to not adopt a suggested response to remove a severe and plausible threat either because they feel incapable of completing the protective action or because the suggested action will not be effective, in their opinion. This could be because the recommended response is perceived as being too expensive, too time-consuming, too difficult, or otherwise ineffective. Rather than concerning themselves with eliminating the threat, individuals in the fear control process put their efforts into avoiding thoughts about the threat or minimizing the issue in some other way (J. W. Brehm, 1966). Combining low perceived efficacy (the combination of ability to complete the response plus the response's effectiveness) and a high perceived threat (in terms of a threat's perceived severity and susceptibility) results in fear control by the audience members (Witte et al., 1996).

Obviously, the health communicator's goal is to put individuals into a cognitive danger control mode of accepting health risk messages and taking action. At the same time, it's essential to keep the audience out of the affective fear control mode that leads to reaction, rejection, or refutation of a health risk message (Witte, 1992b; Witte et al., 2001). In practical terms, then, the EPPM encourages message designers to deliver messages that provide a threat perceived to be real (because individuals feel susceptible or that the outcome would be severe or both) while also providing an efficacy component (response efficacy, self-efficacy, or both) stronger than the initial threat. In short, the cognitive response efficacy must be stronger than the affective fear element.

One way of determining how people will react to a message is to determine what Witte et al. call a "critical point" for that message (Witte et al., 1996). The purpose of this is to mathematically express the point at which people switch from danger control into fear control. As discussed prior, this is the point at which individuals feel that they are not capable of taking action to avoid a real and significant threat, placing them in the fear control category. Rather than taking action against the threat itself, individuals in the fear control process focus on their fear. Health protective behaviors are not the priority for these individuals because they're focusing on their reactance or denial of the problem at hand, thereby allowing fear control to interfere with danger control (Witte, 1992a).

The numerical value of the critical point will change according to the subject matter, population, or particular individuals, but the formula still serves to differentiate between people in the danger control and fear control groups (Witte, 1994b). The formula is the z-score of the efficacy questionnaire items minus the z-score for the perceived threat items. If the obtained result from the standardized scores is positive, the individual (or group) is

in the danger control process. Efficacy is higher than perceived threat in this case, meaning health protective behavior can be expected in response to the risk message. A negative score indicates the respondent (or group) is following the fear control path. Witte et al. (1996) provide specific items to determine perceptions of threat (susceptibility and severity) and efficacy (response and self).

One consistent application of the EPPM has focused on how it can be used by healthcare practitioners to develop theoretically guided campaigns (Stephenson & Witte, 2001). Typically, the stated goal in these publications is to avoid ineffective health intervention campaigns that fail to produce positive change (Witte et al., 1996) or result in the opposite of the desired behavior (R. W. Rogers, 1983; R. W. Rogers, & Mewborn, C. R., 1976). As Witte et al. point out, considering this dichotomy of results is a key consideration for healthcare providers and practitioners when delivering health messages, especially fear appeals (Witte et al., 1996).

The EPPM has been tested in a wide range of topics, including: breast cancer (Kline & Mattson, 2000), cardiovascular disease (McKay, Berkowitz, Blumberg, & Goldberg, 2004), HIV/AIDS prevention (Witte, 1992a; Witte, Cameron, Lapinski, & Nzyuko, 1998), skin cancer (Stephenson & Witte, 2001), and teen pregnancy (Witte, 1997). Populations used in EPPM studies have also varied along with the health topics. Respondents have been segmented by education level (Gore & Bracken, 2005; Murray, Hubbell, Witte, Sampson, & Morrison, 1998; Witte, 1994a), ethnicity (Murray et al., 1998), occupation (Witte et al., 1998; Witte et al., 1993), and geographic location (Witte et al., 1998).

Data across the range of studies are consistent with the constructs in the EPPM, according to Witte and Allen's review (2000). As fear appeals get stronger, they result in larger fear-control, defensive responses (r = .20) instead of cognitive, danger control responses such as attitude (r = .14), intention (r = .11), or behavior (r = .15) change. These fear control responses are also inversely linked (r = -.18) with danger control reactions, matching the EPPM (and parallel response model) prediction that those defensively avoiding a recommendation will not be inclined to follow a message's suggestions. Another inverse relationship shows up between weak efficacy messages and fear control responses (r = -.11), supporting the EPPM's hypothesis that a weak efficacy message leads to stronger fear control responses.

RPA extension

The Risk Perception Attitude framework stems from the hypotheses of the EPPM, predicting that efficacy beliefs will influence perceived risk's affect on action-oriented behaviors (Rimal & Real, 2003). As Rimal and Real (2003, p. 372) point out, this idea mirrors Bandura's social cognitive theory in that individuals with high levels of efficacy "construe potential risks as challenges to be overcome," as opposed to low-efficacy individuals that would tend to view potential risks through a fatalistic lens (Maibach & Cotton, 1995).

Considering these predictions, the RPA framework breaks individuals up into four attitudinal groups, based upon their perceived efficacy and risk. The four groups are:

- Responsive: individuals with high perceived risk and high efficacy; it is expected that they will be the most motivated group when it comes to

taking self-protective behavior, based upon their awareness of their risk status and their belief that they have necessary skills to make change.

- Avoidance: high perceived risk paired with low efficacy beliefs; the coupling of high risk and low efficacy is expected to put these individuals in an uncomfortable situation, as their high risk renders them aware of their health status but their low efficacy beliefs remove motivation to act; they are expected to be less motivated than the responsive group.

- Proactive: characterized by low risk perceptions and high efficacy beliefs; risk perceptions do not push these individuals, but they may maintain a positive outlook on their health status.

- Indifference: defined by low perceived risk and low perceived efficacy; indifferent individuals do not feel they are vulnerable to the health risk, nor do they feel that they could respond appropriately if they were; this is expected to be the least motivated group.

These categories serve to provide a context for audience segmentation based upon the EPPM's predictions, ideally allowing for more effective message design. In addition, the EPPM helps predict message-exposure outcomes for the four RPA groups (Rimal & Real, 2003). At its most basic, the RPA framework is another context in which the EPPM is tested.

Key variables in fear appeal research

Several scholars have conducted meta-analyses to parse out the plausibility of competing fear-appeal models according to the provided data since each makes different predictions concerning how fear appeals influence outcomes (Boster & Mongeau, 1984;

Mongeau, 1998; Sutton, 1982; Witte & Allen, 2000). These meta-analyses focused on published studies that fit a traditional fear appeal approach (a message intended to cause fear and produce a particular outcome as a reaction) and reported enough information to allow for further statistical analysis.

Results from the meta-analyses and other fear appeal research efforts are organized below by variable, as the fear appeal models generally employ similar dependent, independent, and moderating variables. The three most common dependent variables are behavior, attitude, and behavioral intention, all discussed below.

Other frequent endogenous variables are the related constructs of perceived fear, perceived threat, and perceived risk. As also discussed in the following sections, these labels are often misused to describe the same construct, which adds a level of complication to any examination of meta-analyses. The confounding language surrounding the emotional reaction to a threatening message presents a particular challenge when comparing studies.

Perceived efficacy is another induced variable found in most models and analyzed below. The last section will discuss other variables that do not play a significant role in the fear appeal literature but have been examined in one or more studies, mostly as moderators.

Dependent variables

Behavior

Behavior serves as a dependent variable in the studies where it is measured. The intended outcome of these few projects was to alter respondents' actions regarding individual behaviors such as getting a mammogram or a vaccination.

Correlations between fear manipulation and behavior vary widely among the relevant studies. Fifteen studies in the Boster and Mongeau review (1984) report data for a fear manipulation-behavior correlation. The correlations range between -.36 and .69 with a weighted mean of .10. The weighted variance in the distribution of these correlations is .04. A weighted variance of .005 is expected from chance alone. The obtained variance is significantly greater than that expected by chance, a finding supported by the X^2 test (X^2 = 125.70, df = 14, p < .001).

The correlation distribution greater than the distribution expected by chance opens the door for possible moderating variables (Boster & Mongeau, 1984). In the end, though, similar relationships between fear manipulation and behavior change were noted by Boster and Mongeau (r = .10) (1984), Mongeau (r = .17) (1998), Witte and Allen (r = .15) (2000) and Sutton (1982). No Sutton correlation is reported for comparison purposes because that review employs a different method of analysis than the others.

As the unexpectedly large variance opens up the possibility of moderating factors, Boster and Mongeau (1984) performed a search for other artifacts that could be influencing the fear manipulation-behavior correlation. Several of the 15 studies also investigate other variables, but few of those projects produce statistically significant or substantial effects for the interactions. Imminence (Chu, 1966) and probability (Griffeth & Rogers, 1976) of the presented message topic, for example, play roles in statistically significant interactions with fear and efficacy, but their effect sizes are small. Imminence interacts with fear and efficacy (η = .11, df = 4) in a way that Chu (1966) interprets as meaning that imminence matters (in drug-taking behavior, in this case) when the perceived efficacy of the suggested response is high and the aroused fear level is low.

Griffeth and Rogers' examination (1976) of probability as it interacts with fear and efficacy also suggests that low fear conditions are more effective at persuasion (Boster & Mongeau, 1984).

Self-esteem is another variable examined by fear appeal researchers (Ramirez & Lasater, 1977). For low self-esteem participants, conformity to message suggestions increases with fear levels (r = .20, df = 100, p < .01) while for high self-esteem individuals, fear had no effect (Boster & Mongeau, 1984). Age also showed a decent-sized, although not statistically significant, relationship with the fear manipulation-behavior correlation. The age of participant correlated negatively with the fear manipulation-behavior correlation (r = -.43, df = 13, p = .06) (Boster & Mongeau, 1984).

Some study characteristics produce interesting correlations as well, even if the small number experiments makes the results unstable (Boster & Mongeau, 1984). For example, the fear manipulation-behavior correlation is stronger for participants that did not volunteer than those that did (r = .37, df = 10, p = .12). This is based a small number of studies, and the results are not statistically significant, suggesting that suspended judgment may be the wisest course while other evidence accumulates (Boster & Mongeau, 1984).

Another study design element worth considering is the correlation between number of items measuring behavior and the fear manipulation-behavior correlation (r = .76, df = 13, p = .001), offering evidence that the unexpectedly large variance in fear manipulation-behavior correlations across studies is the result of the reliability of the behavioral measures.

Also worth noting is that in the studies where both correlations are available (13 out of 15 for Boster and Mongeau's meta-analysis), the relationship between the fear manipulation-behavior correlation and the fear manipulation-perceived fear correlation (the manipulation check, here) ranged widely from -.91 to .85 with a weighted mean of .45. The obtained weighted variance of .19 is greater than the expected variance of .004 (X^2 = 881.58, df = 12, p < .001) (Boster & Mongeau, 1984).

Interesting relationships among the variables and design aspects make the fear manipulation-behavior data difficult to interpret. The large variance in the correlation distribution and the presence of some statistically significant—although not large—moderator effects (such as for the number of items used to measure behavior) could indicate the existence of moderating variables (Boster & Mongeau, 1984). The small amount of data, however, prevents any firm conclusions. Error of measurement, then, could be playing a key role in the variance of the distribution of fear manipulation-behavior correlations.

Attitude

Attitude in fear appeal research refers to the measurement of individuals' evaluations of specific behaviors. In this persuasive context, the goal is to alter the outcome of how individuals appraise certain behaviors or change their predisposition toward some activity (Severin & Tankard, 2001). Typically, an attitude-adjusting fear appeal seeks to associate some negative behavior with a negative outcome (LaTour et al., 1996), such as smoking and lung cancer or not brushing one's teeth and cavities (Mayfield, 2006).

The fear manipulation-attitude correlation resembles the other fear manipulation-dependent variable relationships in that it has a wide range: -.25 to .63 with a weighted

mean of .21 for Boster and Mongeau (1984), a mean of .20 for Mongeau (1998), and a mean of .14 in Witte and Allen (2000). Boster and Mongeau (1984) point out in their meta-analysis that the weighted variance in the distribution is larger than expected by sampling error alone (.03 to .01 in this case). The fact that the variance in the distribution of correlations is larger than expected by chance means it is possible that other variables moderate the fear manipulation-attitude connection.

Similar to the fear manipulation-behavior correlations in the prior section, the size of the fear manipulation-perceived fear induction-check correlation is correlated with the size of the fear manipulation-attitude correlation (r = .41) (Boster & Mongeau, 1984). The data show that as the fear manipulation-perceived fear correlation rose so did the fear manipulation-attitude correlation. Using the data from the 17 relevant studies with measurement of both fear manipulation-perceived fear correlation and the fear manipulation-attitude correlation, Boster and Mongeau (1984) looked deeper into the relationship between the two correlations. They divided the fear manipulation-attitude correlation by the fear manipulation-perceived fear correlation. The ratio between the two correlations varied widely in the studies from -.61 to 1.57 with a weighted mean of .57. The distribution had a weighted variance of .24, significantly larger than the .004 expected by chance.[6]

This action produced two things: a measure of the strength of the fear manipulation-attitude correlation when corrected for the fear manipulation strength and an estimate of the correlation between perceived fear and attitude, assuming perceived fear mediates the relationship between the fear manipulation and attitude. This link stresses the need for

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[6] The chi-square test supports that the two variances are significantly different than expected by chance (X^2 = 1 354, df = 16, p < .001)

strong inductions, as the application of the fear appeal manipulation could restrict some of the variance in the fear manipulation-attitude correlations (Boster & Mongeau, 1984).

Along with relationships among the variables, experimental artifacts could also influence perceived fear-attitude correlations (Boster & Mongeau, 1984). Differences in the reliability of measurement of perceived fear and attitude, for example, could attenuate correlations differentially, altering the variance of the correlations.

Boster and Mongeau (1984) cite some indirect evidence to support the idea that differential reliability increases the variance in the distribution of the fear manipulation-attitude correlation. The experimental design is correlated with the size of the fear manipulation-attitude correlation ($r = -.20$, $df = 23$, $p = .17$). While not statistically significant at the .05 level, this relationship does point to a trend for larger correlations in a posttest-only design when compared to a pretest-posttest experiment.[7]

In addition, the number of items used to measure attitude and the fear manipulation-attitude correlation are positively related ($r = .36$, $df = 21$, $p = .05$ in Boster and Mongeau, 1984). Thus, the more items used to measure attitude, the stronger the fear manipulation-attitude correlation. Looking at the same issues through another method, Boster and Mongeau (1984) also found standardized regression coefficients even larger than the zero-order correlations when the fear manipulation-attitude relationship was regressed onto type of experiment design and number of items in the measurement instrument ($\beta = -.24$ for type of experiment and $\beta = .39$ for number of items, $R = .43$).

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[7] Boster and Mongeau are careful to state in a footnote of their own that this correlation between experiment type and fear manipulation-attitude was computed using the absolute value of the fear manipulation-attitude correlation as the dependent variable. They contend that it's the strength of r and not its sign that matters theoretically.

Another methodological artifact that could affect the fear manipulation-attitude correlations is restriction in range (Boster & Mongeau, 1984). Studies with more levels of fear manipulation reported larger fear manipulation-attitude correlations ($r = .31$, $df = 23$, $p = .07$). Having increased variance in the independent variable reduced the amount of attenuation due to restriction in range for the fear manipulation-attitude correlation. It seems that using several levels of fear tends to result in larger fear manipulation-attitude correlations than studies using only a few levels of fear manipulation.

Calculating a multiple correlation for the methodological artifacts with the fear manipulation-attitude correlation can estimate how much of the variance in the fear manipulation-attitude correlation is due to type of design, number of items used in measurement, and number of levels of the independent variable (Boster & Mongeau, 1984). The resulting R equals .50, indicating that artifacts drive an extensive amount of the difference in the fear manipulation-attitude correlation distribution.

Behavioral intention

Behavioral intentions present an interesting case as a dependent variable because they may be more common than researchers realize (Witte & Allen, 2000). Early work used a variety of measures to document attitudes, and some may really have measured behavioral intentions instead of attitudes. Studies claiming to look at fear appeal-attitude relationships may in fact be measuring fear appeal-behavioral intention relationships.

Generally agreed-upon definitions used in more current message-design research during the last decade and a half have alleviated some of this confusion. Attitudes are now defined as evaluations of specific behaviors, and intentions are a person's aim to complete a certain behavior (Witte & Allen, 2000).

One potential result of more consistent definitions noted by Witte and Allen (2000) in their meta-analysis is that the fear manipulation's influence on the common dependent variables leveled out over time. Only the Witte and Allen (2000) meta-analysis looked at the fear manipulation-behavioral intention correlation, reporting a result of .11, within the range of the other danger control, action-oriented responses. Across the literature, as noted earlier, the correlations for fear manipulations with attitudes, intentions, and behaviors were relatively consistent at r = .14 for attitudes, r = .11 for intentions, and r = .15 for behaviors.

Sutton (1982) also found significant positive effects for strength of fear appeal on behavioral intentions using z-scores as a meta-analytic tool, but his difference in method prevents mathematical comparison to the other reviews. Like for behavior and attitude, stronger fear appeals seem to lead to more change in intentions (Witte & Allen, 2000). The same could be said for stronger severity, susceptibility, response efficacy, and self-efficacy messages (Witte & Allen, 2000).

Common endogenous variables

Three variables play the most consistent roles within fear appeal models. Two of them—perceived threat and perceived fear—are related constructs linked with reactions to the fear manipulation in fear appeal models. Efficacy is another often-applied variable usually manipulated within the message content.

Perceived threat

Perceived threat is a cognitive construct (Witte, 1998) that entered fear appeal research around 1975 in the work of Rogers (1975). It consists of two dimensions, perceived susceptibility and perceived severity (Witte, 1998). Perceived susceptibility is

the degree to which one feels at risk for experiencing a threat while perceived severity is the magnitude of harm expected from the threat at hand.

In the fear appeal literature, threat is a stimulus variable defined as a message focusing on the severity ("Lung cancer leads to death.") and susceptibility ("You're at risk for lung cancer because you smoke.") of a threat (R.W. Rogers, 1975; R. W. Rogers, 1983). While the threat may exist whether a respondent is aware or not, measurement does depend upon the person holding cognition that the threat exists, meaning that person is perceiving the threat (Witte, 1992b).

Perceived severity and susceptibility matter because evidence indicates that they are the cognitive channels mediating how threat messages influence acceptance of message recommendations (Beck & Frankel, 1981). The emotional states associated with threat messages are not long-lasting and lack substantial direct effects on future decisions, instead depending upon cognitive factors to have any influence (Mewborn & Rogers, 1979; R. W. Rogers, & Mewborn, C. R., 1976).

Perceived fear

Fear is an affective construct referring to a negative emotional response to a threat that expresses some danger (Tanner, Hunt, & Eppright, 1991). It is joined with a high level of physical arousal resulting from a relevant, noteworthy threat (Vrana, Cuthbert, & Lang, 1986) and can cause feelings of uncertainty and risk-averse decision-making (Jennifer Lerner, Gonzalez, Small, & Fischhoff, 2003; Jennifer Lerner & Keltner, 2001).

As Witte (1992b) summarizes, fear may be communicated in a variety of ways: physiologically through arousal (Mewborn & Rogers, 1979), by verbal self-reports (R.W. Rogers, 1975), or through physical acts such as facial expressions (Marsh, Adams, &

Kleck, 2005). Verbal self-reports show a particularly useful ability to measure fear, according to Rogers' (1983) work linking physiological displays of fear and self-ratings by respondents. Physiological arousal varies during exposure to a fear message, but a self-reported emotional state is at least slightly more enduring.

While fear and threat are separate constructs, the two are strongly linked (Witte, 1992b, 1998), occasionally leading to a confused relationship among researchers (Witte & Allen, 2000). Some publications, including several meta-analyses (Boster & Mongeau, 1984; Sutton, 1982), treat fear appeals, fear and threats interchangeably (LaTour & Rotfield, 1997). Such usage can obviously pose problems for analysis since the cognitive threat and affective fear do not necessarily match and certainly are not equal for every respondent. (Rotfeld, 1988). As a result of this potential mismatch, more research would be well served to examine fear and not only look at threat's correlation with the dependent variable, as doing so ignores individual-level emotional reactions to the message (LaTour & Rotfield, 1997).

The confusion in terms also presents challenges for interpreting results. Any study where threat perception is actually being manipulated instead of fear would expect a reduced manipulation-perceived fear correlation. Fear measurement can serve as a check on messages' threat status since fear is assumed to follow a threat as an emotional reaction (Witte & Allen, 2000). However, any measured fear reaction in this case would be the side effect of a presented cognitive threat, effectively adding another step to the model being tested. Because threat is the focus of the induction, for example, one would expect a larger threat manipulation-perceived threat correlation than a fear manipulation-perceived fear relationship.

In most models, the "perceived fear" variable measures the correlation between the message manipulation and respondents' reported perceived fear, often serving as an induction check. Results for the manipulation-perceived fear correlation range widely across studies from .17 to .81 with a weighted mean of $r = .36$ in Boster and Mongeau (1984) and $r = .34$ in Mongeau's meta-analysis (1998). The results vary widely for a number of reasons, including experiment design, respondent groups, message design, restriction in range, and length of the measurement instrument.

As Boster and Mongeau (1984) point out, roughly one-third of the studies use a single-item measure of perceived fear, making it likely that these studies underestimate the correlation between message manipulation and perceived fear. If all the studies had been able to correct for attenuation resulting from error of measurement, it is entirely possible the distribution variance of message manipulation-perceived fear correlations would be quite reduced.

Another issue is that despite the volume of studies, several meta-analyses show that researchers have not created particularly strong fear manipulations. The mean fear manipulations in the Boster and Mongeau (1984) ($r = .36$), Mongeau (1998) ($r = .35$) and Witte and Allen (2000) ($r = .30$) pieces demonstrate these mediocre relationships between the intended manipulation and the actual effect on participants. The mean manipulation-perceived fear correlations above make it difficult for the experimental manipulation to strongly impact outcome variables, according to most theories. Since the theories use perceived fear as a moderator between the manipulation and the dependent variables, a not-strong fear appeal message prevents the manipulation from having a strong impact on outcomes (Boster & Mongeau, 1984).

As Boster and Mongeau (1984) explain in the most conservative example possible, if the perceived fear-attitude correlation is perfect ($r = 1.00$) and the fear manipulation-perceived fear correlation is the mean ($r = .36$), then the fear manipulation-attitude link cannot exceed $r = .36$ except by sampling error. This is not statistically significant at the .05 level in any study with fewer than 25 subjects. Of course, other variables influence attitude, making the idea of a perfect perceived fear-attitude correlation impossible. Using a more realistic—but still substantial—correlation for the example above, the results are even more vivid.

With a perceived fear-attitude correlation of $r = .50$, the fear manipulation-attitude correlation is limited to $r = .17$ plus sampling error (Boster & Mongeau, 1984). This is roughly the mean fear manipulation-attitude correlation from the Boster and Mongeau meta-analysis. Also, this correlation would be statistically significant at the .05 level with more than 92 participants, a standard not met in a number of fear appeal studies.

More recent fear appeal research, however, has produced more consistent results both for fear inductions and dependent variables (Witte & Allen, 2000). One cause for this could be improved definitions for outcome variables such as behavioral intentions, as discussed earlier (2000). Potentially, the result of these newer definitions noted by Witte and Allen (2000) is that fear manipulation's influence on the key dependent variables has leveled out, as the correlations with attitudes, intentions, and behaviors have become relatively consistent ($r = .14$ for attitudes, $r = .11$ for intentions, and $r = .15$ for behaviors).

Efficacy

Like perceived threat, perceived efficacy entered the fear appeal literature in the work

of Rogers (1975), and like perceived threat, it is measured across two dimensions:

perceived self-efficacy and perceived response efficacy (Witte, 1998). Self-efficacy

generally is defined as people's beliefs about their capabilities to exert behaviors in a way

that influences other events in their lives (Bandura, 1994). In the fear appeal context,

perceived self-efficacy is one's beliefs about his or her ability to perform the

recommendation contained in the fear appeal message. Response efficacy refers to one's

belief about the effectiveness of the recommended response in avoiding the threat. This

includes how a person assesses the benefits and costs of a recommended action (Maiman

& Becker, 1974)

When manipulated in a manner similar to threat appeals (multiple conditions in an

experiment), efficacy messages produce decently large effects (Witte & Allen, 2000). In

one meta-analysis, response efficacy and self-efficacy produced similar correlations on

the common dependent variables (between .12 and .17 for response efficacy and self-

efficacy with attitude, intention, behavior change) (Witte & Allen, 2000, see p. 599 for

the individual correlations).

Efficacy, however, was at one time not a commonly analyzed variable (Witte &

Allen, 2000). According to Witte, a number of researchers failed to examine its role in

persuasive fear appeals (for example, see Ben-Sira, 1981; Burnett, 1981; Burnett &

Oliver, 1979; Kohn et al., 1982; Ramirez & Lasater, 1977).

As discussed at several points, prior research has shown that perceived efficacy plays

a role in predicting adherence to the recommended action being promoted in the message

condition. It is reasonable to expect that the same relationship will appear here as well, thus:

H1: Higher perceived efficacy will associate positively with higher behavioral intention to take self-protective action.

Additional variables in fear appeal research

Other variables have regularly entered fear appeal research in various attempts to improve the explanatory and predictive power of models, the idea being that moderators may influence outcomes in some way. For example, the manipulation-perceived fear relationship may be affected by some moderator before that relationship then influences the dependent variable; similarly, moderators could directly impact perceived fear before it interacts with other moderators and then outcomes (Boster & Mongeau, 1984; Witte & Allen, 2000). Despite these possibilities, some researchers do still argue that individual differences rarely interact with fear appeal strength to influence outcomes (Witte & Allen, 2000). However, studies on individual difference variables have been too limited to draw firm conclusions, leading some to call for more research on personal characteristics and their influence on fear appeals (Ruiter, Verplanken, De Cremer, & Kok, 2004). Individual difference variables that have received prior consideration are discussed below:

Source credibility

Source credibility is examined in three studies discussed by Boster and Mongeau (1984). Two of the studies found a statistically significant fear by source credibility interaction (McCroskey & Wright, 1971; Powell & Miller, 1967) while the third presents a small, non-significant interaction of $r = .04$ (Hewgill & Miller, 1965). While the two

studies reporting significant effects did find non-trivial interactions, it is plausible that results are based on unusual elements of the experimental designs (Boster & Mongeau, 1984).

The Powell and Miller (1967) study reports a large effect size (η = .36, df = 4), but most of the effect is due to one treatment condition (Boster & Mongeau, 1984). The study uses three credibility treatments: low credibility, high credibility, and an unattributed source with measurement based primarily on trustworthiness. Perceived competence is not manipulated to any great degree nor are ratings for other possible variables such as dynamism reported. The interaction effect for fear and source credibility depends mostly upon the unattributed source condition. If it is removed, the fear by source credibility interaction drops precipitously to η = .10 (2 df) and lacks statistical significance.

Boster and Mongeau (1984) argue that little theory available at the time would support the existence of a fear by source credibility interaction. Powell and Miller (1967) hypothesize that such an interaction will be found, but they fail to provide a rationale. A problem in their analysis is that they failed to perform a credibility manipulation check on the unattributed source condition. The authors assume the unattributed source will fall between the low and high credibility conditions, but there is no way to know to what degree the respondents attributed some level of credibility to the unattributed source. Boster and Mongeau's examination of the fear manipulation and attitude data shows that it is likely that the respondents considered the unattributed source to be highly credible. The high credibility and the unattributed source conditions show similar patterns for the manipulation check and attitude data.

McCroskey and Wright's (1971) experiment reported an interesting finding concerning its control group that motivated Boster and Mongeau to write that the reported fear by source credibility interaction could be based on issues with the execution of the experiment. In this study, two levels of source credibility were used to get an effect size of $\eta = .12$ (2 df), most of which is based on variance with competence. Trustworthiness is little affected by the source credibility manipulation, and dynamism is not influenced at all, resulting in an effect size smaller than in Powell and Miller's (1967) work.

The unusual portion comes in when one examines the data concerning the control group. The high credibility source produces more favorable attitudes in both the high fear and low fear treatment groups. The control group reports a small, statistically significant difference in the opposite direction. Without the control group data, no interaction is found (Boster & Mongeau, 1984).

This lack of interaction is the case for all source credibility experiments, according to Boster and Mongeau's meta-analysis (1984). All three projects manipulate source credibility and fear on two levels, but when the data are analyzed according to the design, no substantial evidence of fear by source credibility interactions are present (Hewgill & Miller: $r = .04$; McCroskey & Wright: $r = .00$; Powell & Miller: $\eta = .10$, 2 df). While some small effects may exist, no strong evidence supports the idea that source credibility is a powerful moderator of the fear manipulation-attitude relationship.

Specificity of instructions

Another moderator variable examined in several studies is the specificity of the instructions offered in the original message (Boster & Mongeau, 1984). Leventhal and

several co-authors examined specificity of instructions for the recommended action in three studies, with two of the studies reporting statistically significant interactions and one not.

The first study (Leventhal et al., 1965) reported that as fear increased, conformity to message recommendations also increased. Fear, specificity of instructions, and whether or not one had a prior tetanus shot interacted to affect attitudes about receiving a tetanus shot. For people with a prior shot, message specifications had no effect on fear levels. Those reporting higher levels of fear, however, did follow the recommendations more closely when the message did not have specific details. For people without a prior shot, the fear effect was stronger when the message included specific recommendations. In both cases, increased fear lead to increased conformity with the recommendations. The three-way interaction's effect size is r = .16 (Boster & Mongeau, 1984). Fear by specificity, however, produces an interaction that is not statistically significant or substantial (r = .02).

The next article by Leventhal et al. (1966) also concerned tetanus shots and claimed that fear and specificity of instructions interacted to affect opinions on the subject. Their data showed that an increase in fear coincided with compliance with message recommendations when the suggestions were specific (r = .14) (Boster & Mongeau, 1984). No evidence of the three-way interaction reported in Leventhal's earlier piece (Leventhal et al., 1965) is present as the result is neither statistically significant nor substantial (r = .03).

Including a manipulation for instructions along with the fear manipulation made little difference in a third study (Leventhal, Watts, & Pagnao, 1967). Examining these

variables and others in relation to attitudes on smoking and lung cancer, the researchers most likely did not find significant effects for a fear by specificity of instructions interaction (Boster & Mongeau, 1984). The article actually does not provide enough data to allow estimation of these interaction effects, but the authors report statistically significant effects for other interactions. It is then reasonable to conclude that the authors would have reported a fear by specificity effect if one were found. According to calculations done by Boster and Mongeau (1984), the effect size for this interaction cannot have exceeded $r = .16$ without being statistically significant at the .05 level. One can then assume that the correlation was below this .16 level or Leventhal et al. would have noted such in their piece.

This makes for uncertain knowledge about the role of how specific instructions and fear interact to shift attitudes (Boster & Mongeau, 1984). One study (Leventhal et al., 1965) noted a fear by specificity by prior experience (tetanus shot) three-way interaction without observing a fear by specificity interaction. Another (Leventhal et al., 1966) lists a fear by specificity interaction but not a fear by specificity by prior shots interaction while yet a third (Leventhal et al., 1967) failed to find a fear by specificity interaction. Based on this small sample of data, there is not evidence to support the hypothesis that fear and specificity of instruction interact to affect attitudes nor is there evidence to support Leventhal's idea that a fear effect only occurs when recommendations are specific (Boster & Mongeau, 1984). More data would permit a meta-analysis to determine whether the shifting results of these studies stem from sampling error, other moderators, or some other explanation.

Demographic, sociopsychological, and health attitudes

Demographic, sociopsychological and health attitude variables have also been examined by fear manipulation researchers (Burnett & Oliver, 1979). A cluster analysis of these three types of variables was used to explain the relationship between fear and attitude toward health maintenance organizations (Boster & Mongeau, 1984).

Data concerning two specific groups showed them to be more receptive to fear appeals than others. For the groups labeled "older liberals" and "older blue-collar blacks," an increase in fear led to an attitude toward HMOs that matched more closely the attitude suggested by the message. However, the complexity of the data involved in the cluster analysis can limit opportunities to clearly determine which variables interact with fear to influence attitude, although the results suggest that age plays a role (Boster & Mongeau, 1984).

Anxiety

Anxiety proved to have a consistent place in interacting with fear to influence attitude, although none of the four studies listed substantial effect sizes ($r = .12$, not statistically significant) in the Boster and Mongeau meta-analysis (1984). Anxiety in this context is defined as a person's characteristic level of anxiety when it comes to personal threats (Witte & Allen, 2000). Witte and Allen (2000) also cite trait anxiety as a variable listed in the literature as having potential to be theoretically important in the persuasive effect of fear appeals. The authors also refer readers to a review by Witte and Morrison (2000) that discusses the various constructs that could represent trait anxiety.

Across the four experiments discussed in Boster and Mongeau, low-anxiety participants showed no correlation—or at best a small positive correlation—between fear

manipulation and attitude. High-anxiety people also showed no significant correlation between fear manipulation and attitude, but some did report a small negative correlation. Witte and Allen (2000) point out that this has been hypothesized as meaning that an individual's characteristic level of anxiety can influence one's reception to fear appeals— a characteristically scared and anxious person may negatively react to a fear appeal. As such, Witte and Allen examined the direct and moderating effects of trait anxiety on persuasive outcomes. The results pointed to trait anxiety not having a significant effect. Witte and Allen (2000) thus conclude that response to fear appeals is not affected by anxiety level.

Boster and Mongeau (1984) noted that methodological artifacts (which they describe in detail) could be responsible for reducing the effect sizes of anxiety; the effects were consistent across all four projects examined, making the possibility worth consideration. While the evidence is limited, Boster and Mongeau (1984) indicate based on the data available at the time that their impression is that fear and anxiety interact to influence attitude change. The effects reported by the relevant studies they discuss are small, but methodological artifacts could play a role in limiting those correlations.

Volunteer/nonvolunteer

A variable with more substantial support for its influence on attitude is a respondent's status as a volunteer or non-volunteer for the experiment, according to a few studies discussed by Boster and Mongeau (1984). Specifically, three studies looking at attitude change report fear by volunteer interaction effects of $r = .25$ (Horowitz, 1969), $r = .15$ (Horowitz & Gumenik, 1970), $\eta = .23$ (4 df) (Horowitz, 1972). This fits with the findings mentioned earlier where the fear manipulation-behavior correlation was stronger for

participants that did not volunteer than those that did, although it was not statistically significant (r = .37, df = 10, p = .12).

Horowitz's 1969 article concerns an experiment looking at fear, the participant's volunteer status, and how often the person saw the persuasive message (Boster & Mongeau, 1984). For those who volunteered, increased fear led to more conformity to the message recommendations (r = .46, df = 58, p < .05) while non-volunteers had the opposite reaction (r = -.21, df = 58, p > .05), even though it was not statistically significant.

Volunteer status also made a difference in another study looking at the interaction between fear and conformity (Horowitz & Gumenik, 1970). Increased fear brought volunteer attitudes in both the high and low fear conditions closer to what was advocated in the persuasive message (r = .33, df = 58, p < .05) but had no effect on the attitude of nonvolunteers (r = -.02, df = 58, p > .05). The difference between the two groups was even more prominent in the high fear condition (r = -.52, df = 58, p < .05 for the high fear condition versus r = -.22, df = 58, p >.05 for the low fear conditions). In addition, participants allowed to choose their experiment conformed more closely to recommendations than those not given a choice, leading to a statistically significant fear by volunteer interaction and a large effect for fear by volunteer by choice of experiment (r = .34) (Boster & Mongeau, 1984).

The third experiment in this series (Horowitz, 1972) used a different fear appeal than the previous two projects, but the results support prior findings, nonetheless (Boster & Mongeau, 1984). The prior two studies (Horowitz, 1969; Horowitz & Gumenik, 1970) used pamphlets and films with differing content. Here, fear is introduced through false

heart rate feedback, and there are five levels of fear content. Again, volunteers abide by the message recommendations more than nonvolunteers with high fear producing more effect than low fear (Boster & Mongeau, 1984). This time, for volunteers and nonvolunteers, fear pushes the level of adherence to message suggestions (r = .48, df = 58, p < .05 for volunteers and r = .20, df = 58, p > .05 for nonvolunteers).

Taken as whole, Horowitz's studies support volunteer status as a strong moderator of the fear-attitude correlation (Boster & Mongeau, 1984). For nonvolunteers, the data are inconsistent, leading to the conclusion that fear does not affect their conformity to the message suggestions. However, for volunteers, the effect of fear is a strong one (r = .42 across the three studies) (Boster & Mongeau, 1984).

As part of their literature review, Boster and Mongeau (1984) pulled out data from the 12 studies that clearly noted the volunteer status of the respondents and the eight that indicated the nonvolunteer status. Both of these groups include the Horowitz studies. Across the 20 studies, volunteers have a much higher fear manipulation-attitude correlation than nonvolunteers. The weighted mean fear manipulation-attitude correlation for volunteers is .32 while for nonvolunteers it is .07. The correlation between volunteer status and the fear manipulation-attitude correlation also provides support for Horowitz's hypothesis (r = -.55, df = 18, p < .05).

Topic relevance

One study also looked at subject matter relevance and its ability to influence attitude change (Berkowitz & Cottingham, 1960). Fear appeal researchers have long surmised that a personal connection or interest in a topic should be connected to responses to persuasive messages, particularly for broadly delivered mass media messages (Kraus, El-

Assal, & De Fleur, 1966). Data from the pair of experiments published in the article by Berkowitz and Cottingham supported the idea that high-relevance, high-fear messages are connected to defensive avoidance. High-fear messages produced stronger reactions and received more attention from respondents, but if those respondents felt the topic was relevant, they were less susceptible to persuasion, according to Berkowitz and Cottingham's projects. Based on these results, the two researchers (Berkowitz & Cottingham, 1960) reported that a high-fear, interesting, low-relevance communication would be the most effective message design.

Such a conclusion, though, does not account for several measurement, design, and conceptualization issues that subsequent research has shown can influence outcomes from fear appeals (Boster & Mongeau, 1984). Specifically, the ages of the respondents (college students), the measurement of the fear induction (one item), and respondent efficacy (not measured at all) are not sufficiently addressed, and all pose problems for the data interpretation.

In addition, the experimenters' categorizations of respondents present limitations as well. The first study divides respondents into high relevance and low relevance groups with a single-item, dichotomous measure asking how often respondents used a car (several times a week versus once a week or less). Experiment number two broadened the measurement some, accounting for car ownership and frequency of use. High relevance was defined as owning a car and using it several times a week. Medium relevance either owned a car and drove less frequently or did not own a car but rode in one several times a week. The low relevance group did not own a car and only was a passenger once a week or on weekends.

Aside from the variable measurement and experiment design concerns, Berkowitz and Cottingham's conceptualization of relevance merits mentioning as well. Their article failed to specify what is meant by the term "relevance." The project's induction was dependent upon an appeal focused on gruesome car-accident images and statistical data in the high fear condition. Their definition of relevance, however, asked only about automobile usage; the measurement of relevance was incomplete.

Both experiments reported here focus on usage more than the variety of elements that can comprise actual relevance. Factors apart from the employment of a behavior or technology can influence relevance, even though other studies have copied this "usage" definition of relevance when it comes to smoking (Insko, Arkoff, & Insko, 1965; Leventhal & Watts, 1966). A fear appeal concerning smoking and lung cancer may be relevant because one is a smoker (usage of cigarettes). However, the same message about the possibility of lung cancer could also be relevant to nonsmokers with family members who smoke, someone contemplating starting smoking (L. Block, 2005), cigarette-manufacturer employees, public health officials, along with any number of people whose jobs, family relationships, or personal beliefs somehow relate to smoking.

A more effective way of measuring the relevance of a topic to a respondent would be to examine what communication researchers call "involvement," as its scope goes well beyond the "usage" definition common to "relevance" research into what is practically relevant to respondents. Involvement is generally defined as "a motivational state induced by an association between an activated attitude and the self-concept" that can be provoked by different dimensions of the individual (Blair Johnson & Eagly, 1990, p.

290). "Self-concept" in this case means the "totality of the individual's thoughts and feelings having reference to himself as an object" (Rosenberg, 1979, p. 7).

The "involvement" construct can be more effective in measuring relevance because the literature differentiates between varied types of relationships among individuals and specific content (Blair Johnson & Eagly, 1989), providing a more nuanced and effective means of understanding how messages or media influence individuals' behavior. Value-relevant involvement, for example, refers to a person's self-identity and acts as a barrier to persuasion since the relevance of the topic is tied closely to the individual's continuing and permanent feelings about himself (Sherif & Cantril, 1947). Smoking behaviors in the relevance literature may fall into this category, as cigarette company research into smokers' motivations reveals that most smokers are "much more alike than different insofar as their motivation to smoke is concerned" (Philip Morris Co., 1969, p. 1). According to Philip Morris' research, smokers start the habit to meet a psychosocial goal, as a "symbolic declaration of personal identity" (Philip Morris Co., 1969, p. 3). They want to tell the world, "This is the kind of person I am," "I am tough," "I am an adventuress," or some other variant of this personal expression theme (Philip Morris Co., 1969, p. 3). The unpleasantness of the first cigarette is overcome by the novitiate's desire to express some value of personal independence. Researcher into smokers' action should measure their behavior as such. Certainly, the long-time smoker adds other motivations such as addiction, but simply measuring usage fails to account for that as well.

Early research into the relevance of seatbelts falls into a similar trap. Measuring usage exclusively leaves out additional elements that would make a discussion of seatbelts relevant. Another aspect of involvement could fill in here, as "impression-

relevant involvement" may have made a difference in Berkowitz and Cottingham's experiments on college students (Berkowitz & Cottingham, 1960). Impression-relevant involvement centers on concern with public perception of the self, meaning the focus is on impressions resulting from communication about a topic instead of the topic itself (Cho & Boster, 2005; Zimbardo, 1960).

Youth are known to be particularly susceptible to impression-based influence (Hanson & Engs, 1992; Neuwirth & Frederick, 2004; Wood, Read, Palfai, & Stevenson, 2001), and seatbelts in the 1960s were certainly not the normal behavior. Seat belts were not even an option in most automobiles until only a few years before Berkowitz and Cottingham's work (National Highway Traffic Safety Administration, 1997), and the modern, three-point seatbelt was not introduced and patented until years after (Bohlin, 1962). As late as the 1983, only 14 percent of Americans wore seat belts, and even a decade after that, a 1995 survey found that teens felt that their peers did not prioritize seat belt use, putting it among the least important preventative health behaviors (Evans, Gilpin, Farkas, Shenassa, & Pierce, 1995). Considering the peer environment surrounding seat belts, any study of youth and driving safety would be well served to consider impression-relevant involvement to understand how norms and peer pressure influence behavior.

Along similar lines, Berkowitz and Cottingham's original motivation for examining relevance still merits consideration, particularly with persuasive messages in health communication. Specifically, they proposed that a fear appeal could serve to gain respondents' attention, and attentiveness would act as a necessary but not sufficient condition for opinion change "either because low interest produces inattentiveness or

because the frustrated audience, venting its aggression, disparagingly dismisses the entire communication" (Berkowitz & Cottingham, 1960, p. 37). Relevant topics, especially, can be expected to hold respondent attention. Berkowitz and Cottingham predicted that relevance would lead to message rejection, but more recent research actually finds the persuasiveness of fear appeals to be greatest for those who perceive the message to be personally relevant (L. Block & Williams, 2002).

In the health arena, outcome-relevant involvement may serve well to measure the relationship between the relevance of health topics and persuasive outcomes. This variable represents a psychological state occurring when some stimulus activates attitudes that are concerned with significant goals or results. Subjects reporting high outcome-relevant involvement tend to be persuaded by strong arguments when compared to low involvement respondents (Blair Johnson & Eagly, 1989), indicating a motivation to undertake message-focused thinking (Chaiken, 1980). This type of involvement can then promote attitude change by using strong, logical, germane arguments, or reduce attitude change by presenting weak arguments and non-issue-related cues (Cho & Boster, 2005). Also, outcome-relevant involvement related to future outcomes likely associates with information-seeking behaviors such as paying attention to media coverage of a topic and being motivated to stay informed (Cho & Boster, 2005).

Thus, it is predicted that outcome-relevant involvement will help predict the relationship between perceived threat and action-oriented outcomes by focusing on how easily a respondent looks to consequences of a particular issue and responds to a logical argument. The relationships between attention to logical arguments, the cognitive

processing of those arguments, and the increased likelihood of successful persuasion leads to the following hypotheses:

H2: Higher perceived threat will associate positively with higher outcome-relevant involvement.

H3: Higher outcome-relevant involvement will associate positively with higher behavioral intention to undertake recommended health-protective behaviors.

Sensation seeking

Sensation seeking is another individual-level variable that has been examined in only a small number of fear appeal studies. Witte and Morrison (1995) completed one such study in an attempt to more effectively target high school students with safe-sex messages. The increasing number of AIDS cases and sexual partners among high school students drove the researchers to study the potential impact of ads on condom use and abstinence. One reason for these growing figures, they reported, was the pervasiveness of risk-takers out to experience a range of sensations (Witte & Morrison, 1995). Such sensation seeking is a character trait concerning the seeking of novel, complex, intense experiences and often accompanied by a willingness to take risks to arrive at such events (Zuckerman, 1991, 1994). Risky sexual behavior among young adults falls into the pattern of youths seeking invigorating and exciting situations.

As a result of this need for novel stimulation, sensation seeking has been shown to indicate susceptibility to substance abuse and other risky behaviors (Donohew, Palmgreen, & Pugzles Lorch, 1994; Donohew et al., 2000). The implications for message design are obvious as these high sensation seekers would be inclined to attend to a different communication style. Messages that fail to elicit high levels of arousal are

labeled "boring" and fail to get attention (Donohew et al., 2000). At the other end of the spectrum, low sensation seekers are averse to intense, complex stimuli (Donohew et al., 2000).

In their examination of this trait, Witte and Morrison (1995) found that sensation seeking was a factor in how the high school students reacted to fear appeal messages, leading them to suggest that safer sex messages targeted toward adolescent populations should account for sensation seeking. However, the experiments did not work out as the researchers expected, potentially in part because the preferred level of arousal for high sensation seekers makes them difficult to threaten. In addition, the high fear messages concerning risky sexual practices may have come across as glamorous since youth tend to believe that they'll always be on the favorable end of any high-risk behavior (Jessor, 1982, 1984). Considering sensation seeking's ability to limit the amount of fear induced by a threat message, it is reasonable to expect that high sensation seekers will perceive less fear than those lower in sensation seeking. Thus:

H4: Sensation seeking will moderate the relationship between message condition and threat perception. Specifically, those high in sensation seeking will report less perceived threat than those low in sensation seeking.

Need for cognition

Need for cognition is another variable that has received limited attention in the fear appeal literature, despite some indication that it influences the processing of fear appeals (Stout & Sego, 1994). Need for cognition is an individual-level variable measuring "the tendency for an individual to engage in and enjoy thinking" (Cacioppo & Petty, 1982, p. 116). Individuals high in NFC are known to extract meaning from persuasive messages in

a way that incorporates active information-seeking and reflection on relevant arguments (Williams-Piehota et al., 2006; Williams-Piehota, Schneider, Pizarro, Mowad, & Salovey, 2003). Low-NFC individuals report less willingness to put in the cognitive effort required to consider logical messages. Instead, these people are more likely to make decisions through heuristics, celebrities, or social expectations (Cacioppo et al., 1996). Details and statistics are particularly effective for the high NFC group while peripheral cues such as sources, visual elements, and number of arguments are persuasive for the low NFC group (Bakker, 1999; Cacioppo et al., 1996; Williams-Piehota et al., 2003).

In a recent study, Ruiter and colleagues (2004) examined need for cognition's effect on fear appeal responses, finding that high need for cognition individuals would be more likely to accept recommended actions than low need for cognition individuals. Conversely, those unlikely to systematically process arguments and engage the evidence may be more likely to resist persuasive messages, a finding that promotes increased pre-testing of messages and even recipients when practical. Based upon prior findings and understandings of systematic processing, it is predicted that:

H5: Need for cognition will moderate the relationship between message condition and threat perception. Specifically, those high in need for cognition will report greater perceived threat than those low in need for cognition.

Other variables

Other variables have shown through a lack of statistically significant or substantial relationships in fear appeal studies that they may not moderate the fear manipulation-dependent variable relationship (Boster & Mongeau, 1984). Importance of topic (Beck & Davis, 1978), medium of presentation (Frandsen, 1963), delay of attitude measurement

(Leventhal et al., 1966) are some such variables. Of course, the data against these variables come from one experiment each, meaning they may yet be established as moderators in future work.

Methodological issues in fear appeal research

Along with the independent and moderating variables that influence levels of dependent variables, methodological issues involving areas such as measurement, message design and audience characteristics can also impact results (Boster & Mongeau, 1984).

Measurement

Reliability of measurement, for example, substantially affects study outcomes. Studies using reliable measures of dependent variables are more likely to find large effects from the fear manipulations (Boster & Mongeau, 1984). Poor measurement of the dependent variable produces attenuation due to error of measurement and decreases chances of statistically significant effects for the manipulation.

The construction of the models ending in these dependent variables is another area of concern. Typical fear appeal models link the level of the threat message to the dependent variable, ignoring differences in individual reactions to the message. However, the individual differences in reactions to threats make the link between fear arousal and desired outcomes (behavioral intentions, for example) a more logical one than the link between appeal strength and outcomes (LaTour & Rotfield, 1997), where fear induction is only a mediator variable (and an often poorly measured one at that). It is, in fact, the aroused state of perceived fear—or perceived threat for some—that interests researchers

when they develop strong fear appeals. The aroused state is the motivator for individuals as researchers attempt to predict outcomes.

Potentially, the failure to more thoroughly examine individual reactions and other variables could limit fear appeal research by offering conclusions that seem generalizable when they are not. As Burnett and Oliver (1979, p. 182) described, "Response to fear is probably specific to the situation, topic, person, and criterion. Thus, the form of the relationship will vary across combinations of these four factors." The way in which an audience perceives messages to be personally relevant must be a consideration in the design of any experiment or campaign (Kelly & Edwards, 1992). An effective message for teenagers is unlikely to be equally effective for parents (LaTour & Rotfield, 1997), a difference to be measured not only through demographics such as age but also through mental states and reactions. Traditional fear appeal work fails to account for the need to find an optimal fear message and measure reactions. Instead, much fear appeal research sticks to the repetition of errors in the research process (LaTour & Rotfield, 1997). Future models would do well to examine the relationship between the reaction to the induction and the dependent variable; it is the reaction that matters when trying to understand individuals' behavior, not the message condition.

Experiment design

The results of the range of fear appeal experiments do point out that it is not apparent on a detailed level what exact content makes for an effective fear-arousing message (Boster & Mongeau, 1984), although fear manipulations seem to have increased in effectiveness since the initial studies (based upon the correlation between the year of study and the manipulation check, $r = .13$, $p < .05$) (Witte & Allen, 2000). However, the

number of treatment conditions (levels of threat) seems to be important to the effectiveness of an experiment. Pre-testing to ensure a message arouses reactions is essential as well (Witte & Allen, 2000).

Along with examining the message, audience analysis needs to play a role in data analysis, as certain findings suggest that demographic and personality characteristics moderate the fear manipulation-dependent variable relationship (Boster & Mongeau, 1984). This leads some to conclude that many fear appeal experiments do not actually measure broad reactions to mass communication messages. Instead, these studies are examining responses to types of threats by specific audience segments (LaTour & Rotfield, 1997). According to some researchers, responses are linked, then, to both target audiences and tailored stimuli (Rotfeld, 1988; Sutton, 1992). Others argue that individual differences such as gender, age, ethnicity, and group membership have generally not influenced buy-in for fear appeal suggestions (Insko et al., 1965; J. P. Kirscht, Becker, Haefner, & Maiman, 1978; Leventhal et al., 1966; Rhodes & Wolitski, 1990) but instead directly linked to outcome variables without interacting with the fear appeal level (Burnett, 1981; Horowitz, 1969; Horowitz & Gumenik, 1970).

Despite the additional concerns, repeated examinations of fear appeals have reported that increases in fear are linked to changes in outcome variables such as behavior, intentions, or attitude (LaTour & Rotfield, 1997; Witte & Allen, 2000). The correlations are not always large or definitive, but across topics and communication methods, increased fear consistently is related to adherence with suggested outcomes (Boster & Mongeau, 1984; Sutton, 1982; Witte & Allen, 2000). As a result, Sutton concludes that

fear arousal through communications is not likely to be counterproductive, as there does not appear to be significant evidence of a "boomerang effect" (Sutton, 1992, p. 519).

Sutton does also note that it is essential to clarify what is meant when authors of meta-analyses report that fear "consistently" increases adherence to suggested outcomes: "The term 'consistently' [does not] mean that every single study showed a significant advantage of higher fear over lower fear. When a large number of independent tests of the same hypothesis are conducted, a certain proportion of non-significant or even reversed results...are to be expected simply by chance. 'Consistently' is used in the meta-analytic sense to mean that the observed results, considered as a set, would be extremely unlikely to occur... [A]cross studies, the greater the difference between experimental conditions in the amount of fear aroused, the greater the difference in acceptance; the relationship was approximately linear" (Sutton, 1992, p. 517).

Chapter 3. Hypotheses and Research Model

One goal of this dissertation will be to examine potential mediators and moderators that could help predict the effectiveness of fear appeal messages. Prior research has offered a number of variables that may contribute to the explanatory and predictive power of fear appeal models. Figure 1 is a model visually representing how the variables listed in the hypotheses below are expected to associate.

As discussed at several points earlier in the dissertation, prior research has shown that perceived efficacy plays a role in predicting adherence to the recommended action being promoted in the message condition. It is reasonable to expect that the same relationship will appear here as well:

H1: Higher perceived efficacy will associate positively with an action-oriented outcome.

Along similar lines of following prior research, an individual with higher perceived risk can also be expected to be more interested in the outcomes of the health behavior under discussion. Thus:

H2: Higher perceived threat will associate positively with higher outcome-relevant involvement.

Outcome-relevant involvement may help predict the relationship between perceived threat and action-oriented outcomes by focusing on how readily a respondent focuses on consequences of a particular issue. Thus:

H3: Higher outcome-relevant involvement will associate positively with higher behavioral intention.

The way people understand the health issue at hand may also be influenced by several other variables that moderate a fear appeal's ability to create the perception of perceived threat. Individuals with an inclination for rational processing, for example, will react to logical explanations of risk in a certain way, as will individuals that prefer arousing experiences. This leads to the following two hypotheses:

H4: Sensation seeking will moderate the relationship between message condition and threat perception. Specifically, those high in sensation seeking will report less perceived threat than those low in sensation seeking.

H5: Need for cognition will moderate the relationship between message condition and threat perception. Specifically, those high in need for cognition will report greater perceived threat than those low in need for cognition.

Taken together, the hypotheses for this research project can visually be represented by the model in Figure 1. The relationships are labeled according to the hypotheses listed previously.

Research Model

Need For Cognition

Researcher-Produced Newspaper Articles on Health-related Topics

H5 +

H4 −

Sensation Seeking

Perceived Threat

H2

Outcome-Relevant Involvement

H3

+

Behavioral Intention

Perceived Efficacy

H1 +
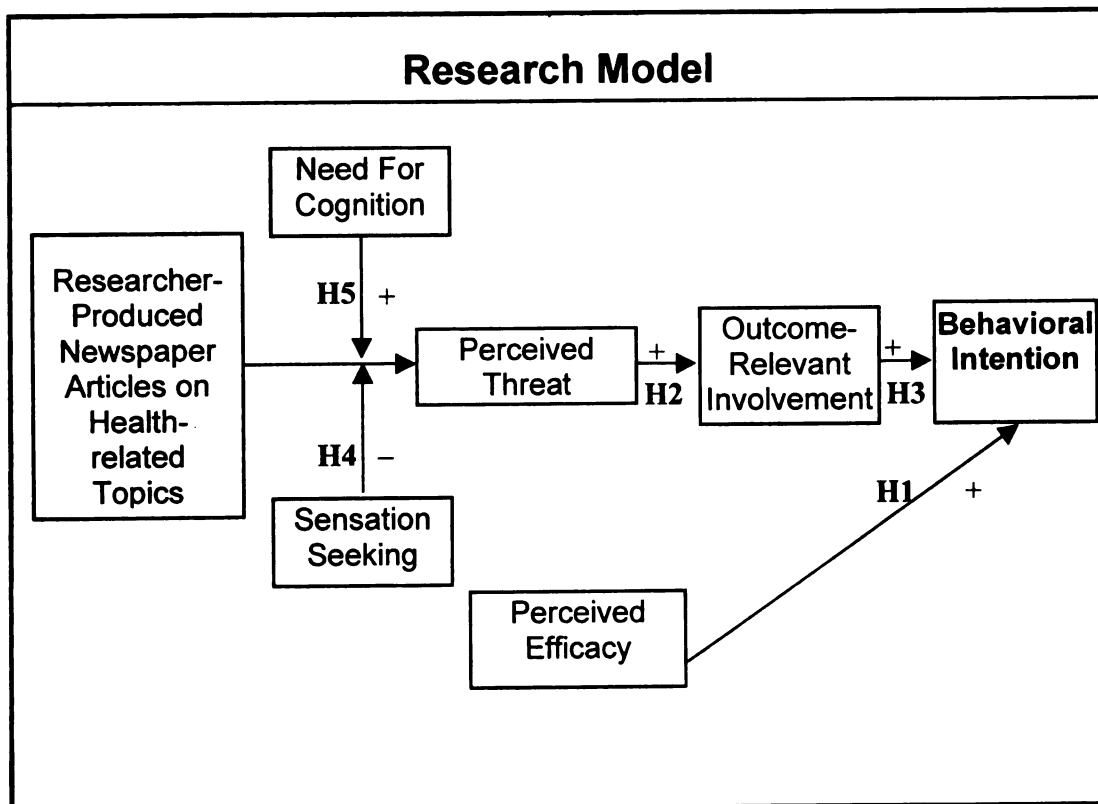
Figure 1. Research Model

Chapter 4. Method

<u>Research design</u>

The experiments conducted in this study were also carried out with the goal of clearing up some of the existing issues in fear appeal research. The experiments were designed to: 1) to examine individual-level persuasion-related variables in the context of the EPPM; 2) to open the context of fear appeal research into wider samples and contexts; 3) and to reduce the impact of poor experimental design and measurement common in prior research. The experiment consisted of exposing the participants to one of five simulated newspaper articles intended to invoke a level of threat concerning a health topic, measuring the variables related to the impact of that article as well as resulting planned behaviors, and examining the relationship between the appropriate variables. The five subject areas were: human Papillomavirus, breast cancer, prostate cancer, food poisoning and clinical trials. Only females saw the breast cancer piece and only males saw the prostate cancer article.

It is essential to note that the use of multiple topics was not intended to test those messages specifically or increase knowledge about essential characteristics of an effective fear appeal message; the goal of employing multiple articles was solely to promote variance among participant responses, a design described as most effective in at least one meta-analysis (Boster & Mongeau, 1984). Restriction in range from having little variance in both the number of treatment conditions and thus responses to the treatments can attenuate the relationships between intended fear manipulations and the outcome

variables (Boster & Mongeau, 1984). Using different messages with different levels of perceived fear will also eliminate message topic as a possible explanation for effects.

Individual-level variables were selected for inclusion based upon prior persuasion and fear appeal research. To improve design and measurement, messages and instruments were pilot tested and adjusted according to the results and considerations of item validity. The pilot test sample was a convenience sample consisting of an online community used to discuss science fiction literature. The final data collection used an international—though mostly American—online survey sample organized through the use of a professional data-collection organization.

Placing the messages within brief news articles opens the context of communication research into fear appeals because prior research has tended to focus only on educational brochures, posters, or instructional videos. More than half of all Americans read a daily newspaper (Project for Excellence in Journalism & Edmonds, 2004), making the medium a logical environment for learning about how individuals mentally gather and process information. The 50-plus percent of Americans reading daily newspapers is also augmented by the up to 100 million individuals who report going online to read news at least some of the time (Project for Excellence in Journalism & Edmonds, 2004). While the offline and online readerships certainly overlap, comprehensive studies of news-consumption habits show that the populations do not perfectly match, particularly for younger individuals (Project for Excellence in Journalism & Edmonds, 2004). This means that the population of regular news consumers in the United States is more than half of all its residents and affirms the importance of examining the news content that

people are exposed to each day. Particularly if one wants to reach a younger demographic, using online media is essential.

Online samples were employed to broaden the sample population from typical fear-appeal research that depends upon students or those living in high-risk environments such as areas with elevated disease rates. In other research projects, Internet-based samples have successfully been used to approximate more traditional data collection methods including mail or in-person surveys (Jason Baker, Woods, & Reynolds, 2007; Hewson, Yule, Laurent, & Vogel, 2003; Kaye & Johnson, 1999; Leece et al., 2004; Witmer, Colman, & Katzman, 1999).

Online sampling is proving increasingly popular because of the efficiencies the Internet can bring to survey sampling. These benefits also require additional vigilance for threats to reliability and validity from factors such as security issues, potential bias, or respondent comfort with technology (Jansen, Corley, & Jansen, 2007). As Jansen and colleagues describe, however, an increasing number of resources are available to aid researchers in planning for potential issues (Lazar & Preece, 1999; Schmidt, 1997). Benefits related to decreased costs, quicker data collection and often higher response rates bring many researchers to conclude that designing around potential problems is well worth the effort (Mehta & Sivadas, 1995).

Article design according to the EPPM

The messages relating to five health-oriented subject areas were intended to address the essential components of fear appeal messages as determined by prior research. According to the EPPM's standards, a message must have a component addressing each of the following areas: perceived susceptibility, perceived severity, perceived self-

efficacy, and perceived response efficacy. A statement of the reader's susceptibility to the health problem and one concerning the severity of the health problem made up the threat component intended to produce a fear reaction.

The opening sentences focused on severity and susceptibility, following the newswriting norms appropriate for a news article. Opening sentences are intended to grab reader attention and summarize the article's content while focusing on a news value such as timeliness or impact (M. Block, 1997; Burns, 2002; Herbert, 2001). Discussing the seriousness of an issue fits just such a task of grabbing attention.

Efficacy components were also incorporated into each article. They focused on preventative behavior and intentions to gather further information. Response and self-efficacy elements, however, were not considered a focus of the research, as the overall goal was to understand reactions to fear appeals. The efficacy components served primarily to aid in the development of behavioral intention measures and complete the EPPM model requirements.

Complete articles for each of the five topics are included in Appendix A. Each article followed the same format on a paragraph-by-paragraph basis, considering that the articles were not intended to have equal amounts of threatening information. Opening paragraphs focused on the threat and importance of the subjects. Second paragraphs continued these themes with supporting information that particularly noted susceptibility statistics. The third paragraphs provided more detailed information on the conditions, including further susceptibility and risk information. The fourth and fifth paragraphs offered details on preventative or beneficial actions that cover the efficacy elements, suggesting positive

behaviors and that readers visit a Centers for Disease Control or National Institute of Medicine educational Web site.

Following the above outline, each of the five articles included the four elements prescribed by the EPPM for an effective fear appeal message. Different elements were often worked into the same sentences to make for more natural and readable writing. The following paragraphs will outline how each of the articles incorporated the four EPPM message elements.

The breast cancer article started with a statement of severity and susceptibility: "Breast cancer remains a top killer of women in the United States despite vast efforts to combat the disease, new health figures released this week show." Calling the disease a killer stresses the severity of having the condition while describing it as among the most frequent ("top") emphasizes that all women are susceptible.

Ensuing paragraphs re-iterate both the severity and susceptibility arguments. The second paragraph highlights the fact that in addition to the tens of thousands of women who pass away from breast cancer each year, thousands more undergo painful, life-altering treatments such as radiation therapy or mastectomies. This paragraph stresses that the severity of the disease is in not only its mortality rates but also the way those afflicted are forced to adapt their lives and deal with negative circumstances. Susceptibility is reinforced by sentences stating that hundreds of thousands of women develop breast cancer each year and that all women are at risk, regardless of age or family history.

The efficacy elements are put forth by sentences in the last two paragraphs focusing on information-gathering as a useful first step in prevention. In addition, this portion of

the article states that a more healthful diet of fruits and vegetables may help fight cancer, as can exercise and supplements such as folate. Self-exams and check-ups are also promoted because of their ability to help women detect problems at any early stage, which may help prevent or limit tumor growth.

The prostate cancer article also begins with a statement of susceptibility, calling the disease "the biggest health threat to men of all ages." The article follows in the next sentence with a severity message noting that prostate cancer "kills tens of thousands of men each year and causes erectile dysfunction in hundreds of thousands more."

The story further pushes the susceptibility element in other ways. It states that the threat of prostate cancer may be growing and that incidences of the disease have increased more than 50 percent in the last 30 years. Severity is further promoted by pointing out that prostate cancer can be considered more dangerous than the better-known breast cancer because the prostate version does not exhibit symptoms in the early stages when it is more treatable.

Efficacy statements enter the story when it mentions that there are methods of slowing the disease's progress or reducing one's risk. Specifically, the article uses the last paragraphs to promote learning about the disease from a Centers for Disease Control Web site, eating a healthful diet, exercise, and certain medications.

The story on human Papillomavirus began with a strong threat message, addressing both susceptibility and severity: "Chances are you have been exposed to the potentially cancer-causing human Papillomavirus virus and don't even know it." Susceptibility was promoted again in the following sentences. One sentence pointed out that almost 75 percent of sexually active adults under 50 have been infected with some form of HPV.

Another sentence noted that 6.2 million new HPV cases occur each year in the United States, that 20 million Americans are infected, and that HPV is the most common sexually transmitted infection. The third paragraph put more emphasis on severity when it stated that HPV leads to certain cancers and that public health experts place HPV among the most serious health issues facing youth.

Efficacy, of course, is handled toward the end of the story when readers are encouraged to visit a Centers for Disease Control Web site to become better informed. Also, the article recommends that readers maintain a monogamous relationship and use condoms when having sexual intercourse.

Information on food poisoning follows the pattern of opening with a susceptibility statement and also follows with some information concerning severity. The susceptibility statement is, "More than a quarter of all Americans come down with food poisoning each year" while the severity component comes next, mentioning that food poisoning sufferers deal with nausea, vomiting and diarrhea. As this story was intended to create only a moderate level of perceived fear at most, both of these elements are obviously less threatening than either of the cancer messages, for example. More susceptibility information covers the fact that there are more than 76 million cases in the US each year. Further severity elements point out that a small percentage of food poisoning victims end up in the hospital.

Prevention messages make up the efficacy components here, as readers were informed that food poisoning can be prevented with simple steps. Washing hands, cleaning utensils, cooking food all the way through, and storing raw and cooked food in separate containers can all help to eliminate the dangerous bacteria and viruses. Readers

were also encouraged to visit a Centers for Disease Control Internet site to learn more suggestions about safe food preparation.

The clinical trial story was designed to act as a comparison condition for the other threat-inducing articles. No threat messages were included in the clinical trials article. The opening paragraphs discussed growing awareness of the existence of clinical trials and opportunities to participate in them. Other paragraphs provided more detailed information on clinical trials, including their aims, frequency, and participant benefits. Readers were, however, provided with efficacy messages about participating in clinical trials. The article suggested visiting an informative National Institute of Medicine Web site, talking to a primary care provider, or even contacting the coordinator of a clinical trial directly.

All of the articles were extensively pre-tested to ensure that reader perceptions matched the intended effects. Instruments, reliabilities, and other results from the pilot study are available in the appendices.

Article attributes

Each article was also manipulated to make them each approximately equal in terms of length and reading level. The pieces were written to specifically avoid technical terms or multi-syllabic words as part of an effort to increase their readability. Also, avoiding such language helped to keep the articles in line with journalistic writing conventions (Knight, 2003).

The resulting five-paragraph articles had a mean length of 262 words, ranging from 233 to 280 words. The five paragraphs contained an average of 1,295 characters, with a low of 1,222 and a high of 1,389. The Flesch-Kincaid Grade Level and Flesch Reading

Ease measurement scales were used to assess reading levels for the articles. The Flesch-Kincaid Grade Level index uses the number of syllables per word and words per sentence to calculate a grade level required for reading. Flesch-Kincaid Grade Level scores for the created stories averaged a ninth-grade reading level, although the breast cancer and clinical trial stories earned scores into the 10-grade level. The grade-level scores across these stories rank equal with mass-market publications such as TV Guide or Time magazine (DuBay, 2005). The ninth-grade reading level also puts the treatment articles about a level below the front-section stories in major metropolitan or national news sources such as the Houston Chronicle (Meyer, 2004), the Wall Street Journal, the New York Times (J. Jung, 2003), and the Washington Post (DuBay, 2005). Some research has reported newspaper readability scores between 16 and 18—content more suitable for college graduates or graduate students (Danielson & Bryan, 1964; McAdams, 1992; Wanta & Gao, 1994).

The Flesch reading ease score is calculated using average sentence length and number of syllables per 100 words. Reading ease scores range from 1 to 100, with 1 being the most difficult to read and 100 being the easiest. Flesch reading ease scores averaged 55.8 across the stories, again making the experiment's created content slightly easier to read than actual news content. One study found the Wall Street Journal's top stories rated a 48.3 on Flesch's reading ease index, while USA Today scored 47 and the New York Times earned a 36.2 (J. Jung, 2003). Other research has shown that newspaper editorials average a 48 on the reading ease index (Murphy, Gamble, & Sharpe, 1994). Table 1 contains the length and readability information for each article.

The articles in use here were intended to be as readable as possible while maintaining journalistic conventions to ensure their plausibility as news stories. If the research participants are not capable of reading and comprehending the texts, the intended manipulations stand zero chance of taking place. Therefore, vocabulary selection and reading level were given primary consideration during the development of the articles.

Table 1. Article Attributes: Length and Readability

Article Topic	Words	Characters	Grade Level	Reading Ease
Breast Cancer	233	1,222	10.7	47.9
Prostate Cancer	280	1,389	9.5	59.9
HPV	275	1,333	9.6	58.5
Food Poisoning	252	1,243	9.9	58.4
Clinical Trials	269	1,288	10.1	54.3
Mean	262	1,222	9.96	55.8

Specific sources were removed from each story in favor of the generic term "public health officials." The objective in removing particular sources from the content was to avoid specific institutions or judgment based upon sourcing. The only proper nouns employed within the articles came in the final-paragraph references to the Centers for Disease Control and the National Institute of Medicine. Both institutions maintain positions among the top health research and policy organizations in the country (Etheridge, 1992) and were also necessary to identify as the sources of the recommended information.

For similar sourcing reasons, all the articles had an Associated Press logo just above the text. Researchers were concerned about the perceived credibility of any newspaper article being influenced by the reputation of a particular publication, as increasing

polarization among media and decreasing trust among consumers may affect the media's ability to effective distribute credible information (Alterman, 2003; Fan, Wyatt, & Keltner, 2001; Kohut, 2004). Considering this situation, the decision was made to link the articles to the Associated Press for two reasons. First, prior experiments have demonstrated such a stimulus can be effective (Callison, 2001; Kahn, 1994). Second, it is a way of associating with a large-scale news organization while avoiding some of the bias accusations attached to specific print or television media outlets. Presenting stimulus materials as AP content was an attempt to present a credible, professional image and avoid the distrust aimed at named, single-brand mass media outlets.

Instrument selection

Measurement instruments used in this study come from prior research studies in which they have demonstrated accepted levels of reliability and validity. As the topic of this project may differ from the original context of the instruments, researchers considered that items would possibly need to be adjusted following the pilot testing. In some cases where a literature review determined that no single instrument was dominant, multiple instruments were pre-tested and piloted for effectiveness and levels of demonstrated reliability. Testing of instruments was intended to serve as means of locating issues in wording, understanding, or effectiveness. The appendices contain the full versions of the tested instruments as well the outcomes from the pilot testing. The following instruments from the following studies were selected to test as measures of relevant variables in this study:

- Perceived Threat: a two-part survey composed of perceived severity and perceived susceptibility taken from Witte, Meyer and Martell's 2001 book *Effective Health Risk Messages: A Step-by-Step Guide* (Witte et al., 2001).

- Perceived Efficacy: also measured by a two-part survey on perceived self-efficacy and perceived response efficacy again with an instrument from Witte, Meyer and Martell's *Effective Health Risk Messages: A Step-by-Step Guide* (Witte et al., 2001).

- Outcome-Relevant Involvement: measured by two instruments in the pilot test—a seven-item instrument developed in Cho and Boster's "Development and Validation of Value-, Outcome-, and Impression-Relevant Involvement Scales" from *Communication Research* (Cho & Boster, 2005) and a three-item version adapted from Park et al.'s 2007 *Human Communication Research* article "The effects of involvement type and argument quality on attitude formation and attitude change" (H. S. Park, Levine, Kingsley Westerman, Orfgen, & Foregger, 2007).

- Sensation Seeking: Hoyle et al.'s eight-item Brief sensation seeking Scale was employed to measure sensation seeking (Hoyle, Stephenson, Palmgreen, Pugzles Lorcha, & Donohew, 2002).

- Need For Cognition: two instruments were used in the pilot test—a three-item need for cognition scale described in Cacioppo and colleagues' article "The efficient assessment of need for cognition" (Cacioppo, Petty, & Kao, 1984) and an 18-item version published by Cacioppo and Petty in a slightly older *Journal of Personality and Social Psychology* publication (Cacioppo & Petty, 1982).

- Behavioral Intention: an adapted version of a *Journal of Medical Informatics Association* instrument measured intentions with six items according to the recommended behaviors contained in each article (Wilson & Lankton, 2004).

Data collection

For the data collection, an online experiment was conducted using a sample provided by an organization specializing in online surveys. Individuals opt in to receiving regular e-mails from the organization for the purposes of completing various surveys. In return for remaining in the survey pool, respondents are entered into monthly $250 drawings for cash prizes. Completing any survey also earns the individual entry into a prize drawing for an amount determined by the sponsoring researcher. Membership in the survey pool is rotated regularly to ensure new membership. Individuals receive no more than one survey invitation a month to ensure that they are not oversampled. All responses from individuals in this survey pool are privacy protected and lacking any identifiable information when delivered to the researcher.

No particular demographic group was purposely included or excluded from the experiment. Individuals listed in the survey pool received an e-mail directing them to the survey Web site and describing the incentive raffle, along with the estimated time to complete the survey. The incentive was entry into a drawing to win one of 10 $100 prizes.

Those responding to the request were re-directed to the Internet survey page where their responses were captured as they clicked through the instruments. Individuals not responding to the initial request received a follow-up e-mail several days later again

requesting their participation and reminding them of the chance to earn an incentive by completing the survey.

Participants were randomly assigned to one of the five message conditions and were exposed to only one article. The order of survey questions was consistent for each individual. The only change was the treatment article and necessary wording changes in the accompanying surveys. Participants were free to take the survey at any computer location convenient to them, such as work, home, library, or school. Survey questionnaires and participant instructions are shown in Appendix D. Individuals were free to quit the survey at any time and were made aware of this in their informed consent form.

Participants

A total of 1,310 individuals from around the globe participated in the experiment in exchange for the opportunity to be entered into the prize drawing. Participants' ages ranged from 19 to 81 with a mean age of 45. The sample was 69 percent female, and 70 percent of respondents were married or in committed relationships. The sample consisted of 57 percent Americans, 16 percent Canadians, 7 percent New Zealanders, and 5 percent British. Individuals reported their ethnicity as white 82 percent of the time, Asian 9 percent, black 4 percent, and multi-racial 3 percent. The online sample was considered appropriate because the project's concern involved mass media messages that reach a wide variety of individuals. As a mass medium itself, the Internet can serve a parallel purpose to traditional mass media and reach similar audiences. In addition, one project goal was to examine fear appeal messages in an environment other than a student sample or individuals living in a high fear environment.

After eliminating 205 responses, 1105 usable surveys remained. Cases were eliminated for two main reasons. A dozen were almost entirely incomplete and merited exclusion because of the lack of even partial data. The solid majority (193 of 205) of the eliminated responses, though, stemmed from suspicious Internet Protocol addresses. These unique addresses function like a phone number or street address and allow computers to communicate over networks. Each survey response was attached to an IP address when entered into the dataset. IP addresses for each individual's connection to the Internet should be unique, if not to the specific computer then to a computer network allowing connection to the Internet. It is possible to share an address among computers on the same operating network; a wireless network in an office may assign each computer the same IP address, for example.

A large number of responses were linked to repeat IP addresses. These responses were isolated from the others for further examination. Keeping in mind that individuals sharing a network could share an IP address, demographic characteristics were examined for similarities. Any responses sharing an IP address and demographic characteristics were eliminated from the dataset on the basis that the IP address duplication was not due to network-sharing. Instead, it was assumed that IP address repetition resulted instead from the same individual completing the survey multiple times. This procedure eliminated 193 responses from the data set.

Researchers assume that the multiple response pattern stems from two factors. One, individuals may have misunderstood the reminder e-mail sent by the survey-sample company. It is possible that they interpreted the reminder as an invitation to complete a

new survey. Second, the repeat-response individuals could have been attempting to gain multiple entries into the incentive drawing.

Other responses, while acceptable, were not 100 percent complete. As is expected, certain respondents failed to complete certain items. To account for these missing responses, SPSS' "missing values" function was used. Specifically, missing data points were filled in by employing maximum likelihood estimation. This method was selected to avoid the biases that can result from common practices such as deleting cases or mean replacement (Croy & Novins, 2005). Mean replacement, for example, can bring about attenuated confidence intervals and false positive Type I errors (Croy & Novins, 2005).

Maximum likelihood estimation is considered by statisticians to be superior to most methods of data completion such as listwise deletion, mean substitution, or pairwise deletion (SPSS, 1999). MLE uses all the available data for each case to calculate estimates, returning the value most likely to have resulted in the observed data (Grace-Martin, 2002). The method returns unbiased parameter estimates and standard errors by computing likelihood functions both for cases missing data and those that are not. An iterative algorithm then compares the results and reports the estimates (SPSS, 1999).

Stimulus

The articles examined in the pilot testing were used in the final data collection as well. Pilot testing did not produce any comments or observations requiring change to the treatment messages. Complete versions are available in Appendix A.

Measurement instruments

The indices used were adopted from previous research with some necessary wording modifications to fit the current project. Instruments were selected based upon their

reliability and validity in prior studies and in pilot testing for this study. The pilot-tested instruments and the outcome data from that testing are available in complete form in the appendices. All constructs in this study were measured by at least three observable indicators (Bentler & Chou, 1987), typically in the form of statements followed by 7-point Likert-type scales. Sensation seeking, however, was measured on a 5-point scale, and respondents showed their comprehension of the treatment-article text through true/false questions.

The final online survey presented instructions, questions, and the treatments in the following order:

- Introduction to survey and consent form

- Thank-you note, survey description, instructions, and consent agreement.

- Demographic questions, including: age, gender, marital status, ethnicity, nationality, familiarity with relevant health topics, relationship status, news-reading habits.

- Sensation seeking instrument: 8 questions with 5-point scales.

- Need for cognition index: 18 questions with 7-point scales.

- Outcome-relevant involvement: 3 questions with 7-point scales.

- Introduction the newspaper article asking respondents to read the content and answer further questions.

- Treatment article concerning clinical trials, food poisoning, human Papillomavirus, prostate cancer, or breast cancer.

- Comprehension questions: 4 questions with true/false format.

- Believability index: 4 questions with 7-point scales.

- Perceived severity instrument (one-half of perceived risk): 3 questions with 7-point scales.

- Perceived susceptibility (one-half of perceived risk): 3 questions with 7-point scales.

- Response efficacy (one-half of perceived efficacy): 3 questions with 7-point scales.

- Self-efficacy (one-half of perceived efficacy): 3 questions with 7-point scales.

- Behavioral intention: 6 items with 7-point scales.

- Thank you note, further information on the treatment article's topic.

Data analysis

Brown-Forsythe and Welch statistics checked the effectiveness of the manipulations of the individual message conditions. These statistics were used because of the non-homogeneity of variance and unequal sample sizes among the clinical trial-, virus-, and cancer-message groups. Games-Howell, Dunnett's T3, and Dunnett's C provided further analysis to more specifically verify differences among the groups, similar to the way other analysis may employ Tukey's HSD. Multiple statistical tests were employed solely to ensure the most conservative analysis possible, considering the limits and irregularity of the data as well as the tests. Violations of parametric analysis' assumptions can somewhat be expected in an experimental project such as this where the sample sizes differ and the induction results in multiple conditions for the treatment variable. The effectiveness of the treatment depends upon rendering the data non-normal within each message condition. That is the very goal of such an induction.

Prior to testing hypotheses, indices were checked for reliability using Cronbach's alpha. Testing of the proposed hypotheses was conducted using multiple regression to examine predicted relationships. Despite the normality concerns for the groups discussed above, regression is appropriate here because hypothesis testing was done with the complete, combined data set. When merged, the groups create a normal data set; the combined conditions create an acceptably shaped data curve. As an analysis technique, regression was a logical choice because one goal of this research was to examine the causal relationships of message reactions and ensuing behavioral intentions. Thus, the proposed relationships should be tested for evidence of substantial paths denoting the influence of one variable on another. In addition, the use of regression allows for the control of outside factors to further isolate and examine the predicted relationships. Outcomes of this testing are presented in the next chapter.

Chapter 5. Results and Discussion

Since the specific message conditions were not of particular focus in this research, data were combined into a single data set. Combining data from different conditions promotes variance in responses, and increased variance was one objective here. The variety among induced levels of perceived risk encourages similar variety in the data for other constructs. Creating multiple message conditions was done specifically to promote variance in this way. Similar studies might focus on the message conditions to examine what makes for an effective fear appeal. Effective message design attributes was not a primary concern in this research. The goal here was to examine how individuals mentally react to such messages and process the presented information, as opposed to how to best induce conditions perceived as risky.

<u>Normality</u>

As a first step in the analysis, the combined data were scrutinized for normality to examine the appropriateness of parametric tests. Normality alone does not determine the correctness of choosing parametric tests, but violating normality can become problematic if other assumptions are also violated (Cramer, 1994).

In this case, normality was determined through visual examinations of P-P plots, Q-Q plots, and histograms. P-P plots and Q-Q plots were inspected to ensure that the data points fell approximately in a straight line. While some sampling variability about the line is to be expected, normal groups will lie consistently around a straight line. Q-Q plots are particularly sensitive to non-normal data in the distribution's tails. P-P plots tend to be more sensitive to departures around the distribution's mean.

Histograms also served to examine the data points in the context of a normal curve. For variables with a plot or histogram that raise concerns, normality was also examined through dividing skewness and kurtosis by their standard errors to be sure the resulting ration was between -1.96 and 1.96.

Manipulation check

The effectiveness of intended fear inductions was assessed using the respondents' ratings of perceived threat. Each of the two dimensions of perceived threat was measured by three seven-point Likert items, adapted from Witte et al.'s book "Effective Health Risk Messages" (2001). An ANOVA examined the impact of the treatment article on the perceived threat scores, as measured by the perceived susceptibility and perceived severity dimensions. However, based upon the post-hoc results, ANOVA proved to not be the most appropriate statistic for testing differences among the groups.

While the F-score was statistically significant, the Levene Statistic test of homogeneity of variance indicates that the ANOVA result is not valid. The Levene Statistic had a value of 37.94 with a p-value < .001. When the p-value is less than .05, the result indicates that homogeneity of variance does not exist across the groups. ANOVA can usually be counted on to be quite robust; however, considering that there are unequal numbers of respondents in each group as well, use of ANOVA here may push the limits of its robustness.

In place of the F-score considering the homogeneity of variance concerns, one has the option of several other tests available to compare group means. This project used the Brown-Forsythe and more conservative Welch tests in place of ANOVA. Both statistics (Brown-Forsythe: 107.62, p < .001; Welch: 88.31, p < .001) were statistically significant,

offering evidence that the perceived threat scores for three treatment groups did differ according to the intended article exposure. Examining the group means for the perceived threat index also indicates that the effects were in the predicted direction ($M_{clin\ trials}$ = 20.86, M_{virus} = 29.39, M_{cancer} = 31. 72). The cancer articles have higher perceived threat scores than the virus articles, which, in turn, associate with higher scores than the clinical trials control condition.

Several post-hoc tests were used to determine the statistical significance of the differences between the groups. While Tukey's Honest Significant Difference analysis would be the common choice for post-hoc analysis, this statistic is not appropriate in this case because of the unequal sample sizes and heterogeneous variances. Instead, Games-Howell, Dunnett's T3, and Dunnett's C were employed to offer multiple options to check the relationships among the three groups. Consistency across multiple tests offers a conservative measure for differences among the treatment groups and ensures that no one test's bias will produce a misleading result. All three analyses confirm that the treatment groups differ at the $p < .001$ level when examining perceived risk scores. The Games-Howell test, in particular, is worth noting because it is the most powerful of the three and is strongly recommended for comparing groups with unequal sample sizes (Toothacker, 1993). The outcomes of the tests are recorded in Table 2. These results can be interpreted as evidence of a successful manipulation of perceived threat in response to the treatment articles.

Table 2. Post-hoc Tests for Group Means on Perceived Threat Index

	Survey condition	Survey condition	Mean Diff.	Std. Error	Sig.	95% Confidence Interval Upper Bound	Lower Bound
Dunnett T3	Clinical Trials	Virus	-8.53(*)	.75	.000	-10.32	-6.74
		Cancer	-10.85(*)	.84	.000	-12.86	-8.85
	Virus	Clinical Trials	8.53(*)	.75	.000	6.74	10.32
		Cancer	-2.32(*)	.59	.000	-3.73	-.91
	Cancer	Clinical Trials	10.85(*)	.84	.000	8.85	12.86
		Virus	2.32(*)	.59	.000	.91	3.73
Games-Howell	Clinical Trials	Virus	-8.53(*)	.75	.000	-10.28	-6.78
		Cancer	-10.85(*)	.84	.000	-12.82	-8.89
	Virus	Clinical Trials	8.53(*)	.75	.000	6.78	10.28
		Cancer	-2.32(*)	.59	.000	-3.71	-.94
	Cancer	Clinical Trials	10.85(*)	.84	.000	8.89	12.82
		Virus	2.32(*)	.59	.000	.94	3.71
Dunnett C	Clinical Trials	Virus	-8.53(*)	.75		-10.28	-6.78
		Cancer	-10.85(*)	.84		-12.83	-8.88
	Virus	Clinical Trials	8.53(*)	.75		6.78	10.28
		Cancer	-2.32(*)	.59		-3.71	-.94
	Cancer	Clinical Trials	10.85(*)	.84		8.88	12.83
		Virus	2.32(*)	.59		.94	3.71

* The mean difference is significant at the .05 level.

Another important check on manipulation is to consider how well readers understood and believed the article content. Comprehension levels are key considerations to verify that respondents read the articles and grasped the content. Just as in the pilot test described in the appendix, comprehension was measured using four true-false items. The items were similar across articles but adapted to the specific topics. Again, all of the comprehension instruments focused on the basic information common to all articles: frequency of the issue, preventative measures, risk factors, and severity information. Items in this instrument were answered correctly 92 percent of the time. Table 3 presents the percentage results for each item and group. Such a high score supports the idea that readers considered the information contained in the articles.

| Car |
| Viru |
| Chr |
| Tot |

Tag

Mea

Table 3. Percentage Comprehension Check Scores by Item and Group

Topic	Item 1	Item 2	Item 3	Item 4	Total
Cancer	.95	.96	.92	.85	.92
Virus	.90	.92	.86	.91	.90
Clinical Trials	.90	.95	.97	.95	.94
Total	.91	.94	.91	.91	.92

Article believability is also a logical portion of a manipulation check because the influence of the articles depended at least in part on their perceived accuracy. Believability was again measured using four items across seven-point Likert-type response scales. All five groups responded to the same four items. Table 4 reports the descriptive statistics for each item in the believability index. Based upon the item scores and mean across the individual items, it is logical to report that respondents found the treatment stories to be believable. Table 5 fulfills a similar purpose for each treatment group, showing that group means were also suitably high.

Table 4. Descriptive Statistics for Believability Items

	N	Mean	Std. Dev.
To me, the advice given in the article is believable.	1105	5.83	1.29
In my opinion, the information given in the article seems useful.	1105	5.73	1.34
The advice given in the article is accurate.	1105	5.48	1.29
The information I read in the article looks true to me.	1105	5.71	1.32
Mean	1105	5.68	1.20

All items used a seven-point Likert-type scale.

Table 5. Believability Index Descriptive Statistics for Groups

Topic	N	Mean	Std. Dev.
Cancer	261	5.73	1.22
Virus	567	5.69	1.21
Clinical Trials	277	5.63	1.16
Mean	1105	5.68	1.20

All items used a seven-point Likert-type scale.

Measurement instrument assessment

The assessment of the measurement instruments occurred in three phases: 1) item

analysis, 2) reliability assessment, and 3) construct validity. Item analysis was completed

through Principal Component Analysis. Each variable in the model underwent Principal

Component Analysis to verify unidimensional relationships. Unidimensionality was

defined as loading on a single factor in the SPSS-provided component matrix in a way

that clearly demonstrated a relationship to the other measurement items. No items needed

to be eliminated due to substantial cross-loadings or low loadings on the intended

constructs. As discussed earlier, all of the instrument were tested and employed in prior

research so the acceptable outcomes were not unexpected.

Reliability assessment on the measurement instruments took the form of Cronbach's

alpha. Each index with multiple items was tested for internal consistency, and the

Cronbach's alpha coefficients for all constructs were higher than the recommended

minimum of .70 (Nunnally, 1978). Table 6 presents the alpha coefficients for each index

along with descriptive statistics.

Table 6. Descriptive Statistics and Cronbach Alphas for Measurement Instruments

Construct	# of Items	Cases	Mean	S.D.	Alpha	Typical Alpha
Perceived Severity	3	1090	14.54	5.60	.93	.80
Perceived Susceptibility	3	1098	12.22	5.52	.91	.80
Perceived Self-Efficacy	3	1092	15.94	4.30	.87	.79
Perc. Response Efficacy	3	1094	16.80	4.15	.89	.79
Park et al. Outcome-Rel. Involvement	3	1097	12.15	4.72	.84	.86
Sensation Seeking*	8	1080	20.97	6.48	.83	.76
Short NFC Index	18	1035	83.46	17.34	.90	.76
Believability Check	4	1091	22.79	4.75	.94	N/A
Behavioral Intention	6	1068	27.89	9.69	.88	.81

*All instruments use 7-point Likert-type scales, except for Sensation Seeking. The 8-item instrument used for Sensation Seeking employs 5-point Likert-type scales.

Interaction terms

Not all measurement items in the dataset are the exclusive product of the survey instruments, however. Several of the hypotheses focus on predicted moderator variables so a logical necessity arises to develop interaction terms. The predicted interactions are between categorical message conditions and continuous variables measured by a series of Likert-scale items. Producing terms for these categorical by continuous variables requires a number of decisions and particular treatments (see Aiken & West, 1991).

First, one must decide how to prepare the categorical variable to render it suitable for the regression equation. A number of options are available here; the most common is using dummy codes to represent the different levels of the categorical variable. It is

important to recognize that dummy codes are not the optimal choice, however, for every project despite their predominance in the social science literature and presence as the default choice (O'Grady & Medoff, 1988). Unweighted effects coding, orthogonal coding, and weighted effects coding all represent options with particular uses that could well serve researchers trying to answer particular questions, with the ultimate choice depending upon the question being asked.

In this particular project, dummy codes were selected nonetheless because of the nature of the relevant hypotheses. This research is not interested in differences across the groups (only differences from the control group of those reading the clinical trials article) so more involved coding methods would serve little purpose. With the control group left out as the comparison sample, the design goals were achieved. Using dummy variables created two dichotomous variables representing the virus and cancer article conditions, leaving out the clinical trials condition as the comparison group.

The next necessary step was to center the continuous variable in preparation for the creation of the interaction terms (Aiken & West, 1991). In these situations, centering the continuous variable increases the interpretability of the interactions and also serves to reduce potential multicollinearity issues with the independent variable. The newly centered continuous variable is then multiplied by each of the dummy coded variables to create two interaction terms for each of the relevant interactions in this project. Interaction terms can then be entered directly into the regression equations (Aiken & West, 1991).

Construct validity

Construct validity of the measurement instruments is also essential to assess as a means of ensuring that the measurement items actually measure the concepts they are intended to measure (Cook & Campbell, 1979; Cronbach, Gleser, Nanda, & Rajaratnam, 1972). A measure is valid to the degree it indicates the magnitude and direction of a representative sample of the characteristics of the construct and that the measure avoids contamination from other constructs or error (Peter, 1981).

Assessing construct validity permits examination of confounding factors such as random error or method variance. Inspecting these issues can help remove some ambiguity from theory testing. Error of measurement, for example, can lead a researcher to reject or accept a hypothesis based not on theory or data but solely on the scope of the project design (Bagozzi, Yi, & Phillips, 1991).

Imperfections, of course, are to be expected in the measurement process. Thus, it is also essential to keep in mind that construct validity is determined only by inferring that the measure's scores perform as relevant theory predicts they should (Peter, 1981). Because construct validity is a continuing process (Cronbach, 1971), construct validation is not to be viewed as empirical proving of a measure because a measure's success depends upon the construct and its predicted relationships (Peter, 1981), highlighting the key role of theory development in this process (Schwab, 1980).

Numerically, assessing convergent and discriminate validity are common means of operationally determining construct validity (Peter, 1981). Convergent validity scrutinizes how items for a construct share variances, showing that they are measuring the same underlying construct (Schwab, 1980). Researchers demonstrate convergent

validity with factor loadings on the intended constructs that are greater than twice the standard errors (Anderson & Gerbing, 1984). Each factor loading for this project's measurement instruments was well more than twice the standard error (.007 - .067).

Rather than showing how items relate to each other, however, discriminant validity is intended to illustrate that measures do not correlate very highly with other measures from which it should differ (Campbell, 1960). Discriminant validity can be determined in several ways (Julie Baker, Parasuraman, Grewal, & Voss, 2002). One method is to inspect the confidence intervals surrounding each pairwise correlation estimate to make certain that the intervals do not contain 1—a signal that the instruments may measure the same constructs (Anderson & Gerbing, 1988). This condition was easily satisfied for all measurement instruments. Another option for examining discriminant validity is to compare the percentage of variance extracted for each construct and compare it to the shared variance (correlation squared) with each other construct (Hult, Hurley, Giunipero, & Nichols, 2000). This condition was also easily met in that the constructs were responsible for different effects. Taken together, satisfying the requirements for both convergent and discriminant provide evidence for construct validity in this study.

Regression analyses

One purpose of the study was to test a number of hypotheses related to several variables' influence on behavioral intention to undertake positive, personal health behaviors. Analysis of these hypotheses began with an examination of the variables' correlations. No strong bivariate correlations were observed between inappropriate variables. Item-item correlations are presented in Table 7.

Table 7. Bivariate Correlations Among Variables

Variable	DV	ORI	Threat	NFC	Virus art.	Cancer art.	SS	Effic.	News use	Age
DV	1.00	.35(**)	.51(**)	.19(**)	.16(**)	.23(**)	.15(**)	.52(**)	.08(**)	0.02
ORI	.35(**)	1.00	.26(**)	.09(**)	-.15(**)	.16(**)	.07(*)	.10(**)	.10(**)	0.01
Threat	.51(**)	.26(**)	1.00	0.03	.10(**)	.46(**)	0.03	.37(**)	0.01	-0.05
NFC	.19(**)	.09(**)	0.03	1.00	-0.01	-0.01	.22(**)	.11(**)	.20(**)	0.04
Virus art.	.16(**)	-.15(**)	.10(**)	-0.01	1.00	-.59(**)	-0.04	.26(**)	0.01	0.01
Cancer art.	.23(**)	.16(**)	.46(**)	-0.01	-.59(**)	1.00	0.04	0.05	-0.03	-0.03
SS	.15(**)	.07(*)	0.03	.22(**)	-0.04	0.04	1.00	0.02	.09(**)	-.29(**)
Effic.	.52(**)	.10(**)	.37(**)	.11(**)	.26(**)	0.05	0.02	1.00	0.06	.10(**)
News use	.08(**)	.10(**)	0.01	.20(**)	0.01	-0.03	.09(**)	0.06	1.00	-0.03
Age	0.02	0.01	-0.05	0.04	0.01	-0.03	-.29(**)	.10(**)	-0.03	1.00

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

DV: behavioral intention; ORI: outcome-relevant involvement; Threat: perceived threat; Virus art.: virus article treatment condition; Cancer art.: cancer article treatment condition; SS: sensation seeking; Effic.: perceived efficacy; News use: frequency of news consumption; Age: respondent age

Variance inflation factor and tolerance results were examined for other undesirable relationships among variables. A series of hierarchical regressions were then used to test the hypotheses shown graphically in the research model originally presented in Figure 1. Hierarchical regression was selected because of the desire to control for certain variables and also to gain additional data concerning variables of interest (Schafer, 1991). This type of regression allows for an understanding of the incremental predictability and the variance explained at each step.[8] In addition, hierarchical regression allows for distinct treatment of time-bound variables that played roles at differing points in the data collection (Schafer, 1991). The consideration of time is relevant here because this project

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[8] As Schafer (1991) highlights, it is essential to keep in mind the limitations of hierarchical regression as well. While its output can offer insight into variables' relationships through incremental predictability and variance explained, hierarchical regression does not make statements about causality that might be implied by those terms. Causal interpretation necessitates an examination of the research design along with the results.

focused on measuring several psychological constructs before inducing reactions to treatment messages and in turn measuring other variables.

In the hierarchical analysis, several variables were employed as dependent variables to match the appropriate hypotheses, moving right to left across the research model presented in Figure 1. The initial test used behavioral intention as the dependent variable to examine the independent variables' relationships with the final outcome variable. This tests hypotheses one and three predicting the ability of perceived efficacy and outcome-relevant involvement to act as predictors of positive behavioral intentions.

The second regressions continued moving backward through the model and used outcome-relevant involvement as the dependent variable in order to examine hypothesis two stating that increased perceived threat will associate positively with increased outcome-relevant involvement.

The final portion of the analysis consisted of two regressions with perceived risk as the dependent variable. This section used two regressions because it was examining a pair of predicted moderator relationships as stated in hypotheses four and five. These hypotheses predicted that sensation seeking would negatively moderate the relationship between the message condition and perceived threat while need for cognition would positively moderate the same relationship between message condition and threat. The individual analyses also allowed for more detailed information. Each regression will be discussed in more details as the results are reported.

The first step in each regression consisted of entering the demographic information and news consumption habits as control variables. Entering these variables into the regression equation allowed for easier examination of their influence on the dependent

variables in the context of the other variables' relationships to the dependent variable.

The second and third blocks in the behavioral intention regression contained the two

variables predicted to have relationships with behavioral intention—outcome-relevant

involvement and perceived efficacy. Block number four consisted of all the other

variables relevant elsewhere in the project, creating, in effect, a saturated model. F-test

results of this regression were significant for all four steps and included notable R^2

changes and significant betas. Table 8 shows the results of the hierarchical regression

formatted according to suggestions of leading methods scholars (Field, 2005; Schafer,

1991). The R^2 change, F statistic, and p-value are presented for each model.

Table 8. Hierarchical Regression Analysis for Behavioral Intention

Model	DF	R-Sq Change	F	P value
1. Demo	12	.17	17.83	<.001
2. ORI	13	.08	26.77	<.001
3. EFF	14	.14	48.34	<.001
4. Others	24	.15	52.04	<.001

1: (Constant), clinical trial experience, HPV experience, believability index sum, relationship status, ethnicity, total news sources consumed each week, gender, article comprehension index sum, age, food poisoning experience, breast cancer experience, prostate cancer experience
2: Model 1 plus Outcome-Relevant Involvement index sum
3: Model 2 plus Perceived Efficacy Index sum
4: Model 3 plus the Need For Cognition by Sensation Seeking interaction term, the Need For Cognition by article subjects interaction terms, the Sensation Seeking by article subjects interaction terms, the Need For Cognition index sum, the Sensation Seeking index sum, Perceived Threat index sum, and article subjects

Table 9 presents more detailed information, showing the beta weights, standard errors,

constants, and standardized betas for each variable entered into the model. Note that the

table is spread across several pages because of its size.

Table 9. Hierarchical Regression Analysis for Behavioral Intention

Model		B	Std. Error	β	Sig.	95% Confidence Interval for B		Step R-sq Change	Collinearity Statistics	
						Lower Bound	Upper Bound		Toler.	VIF
Step 1	(Constant)	10.55	2.197		.000	6.24	14.86	.17		
	BLV sum	.81	.058	.40	.000	.69	.92		.93	1.08
	CMP sum	-3.67	1.698	-.06	.03	-7.01	-.35		.92	1.09
	Gender	.36	.622	.02	.562	-.86	1.58		.92	1.09
	Age	.01	.024	.01	.80	-.04	.05		.89	1.12
	ethncty	.23	.199	.03	.253	-.16	.62		.96	1.04
	rltnshp stat	-.08	.203	-.01	.711	-.47	.32		.98	1.02
	ttl nws src	.45	.186	.07	.02	.08	.81		.95	1.05
	HPV exper	.10	.350	.01	.781	-.59	.78		.82	1.22
	prst cncr expr	.47	.31	.05	.124	-.13	1.08		.74	1.35
	food pois expr	.18	.27	.02	.499	-.35	.71		.78	1.28
	brst cncr expr	-.07	.25	-.01	.777	-.56	.42		.74	1.35
	clin trl expr	.14	.43	.01	.751	-.71	.98		.98	1.02
Step 2	(Constant)	5.81	2.14		.007	1.62	10.01	.08		
	BLV sum	.73	.06	.36	.000	.62	.84		.91	1.10
	CMP sum	-3.18	1.62	-.05	.05	-6.35	.00		.92	1.09
	Gender	.02	.59	.00	.974	-1.14	1.18		.91	1.10
	Age	.00	.02	.00	.91	-.04	.05		.89	1.12
	ethncty	.30	.19	.04	.119	-.08	.67		.96	1.04
	rltnshp stat	-.17	.19	-.02	.383	-.55	.21		.98	1.03
	ttl nws src	.27	.18	.04	.135	-.08	.62		.95	1.06
	HPV exper	.18	.33	.02	.592	-.48	.83		.82	1.22
	prst cncr expr	.30	.29	.03	.303	-.27	.88		.74	1.35
	food pois expr	.20	.26	.02	.431	-.30	.70		.78	1.28
	brst cncr expr	-.13	.24	-.02	.577	-.60	.33		.74	1.35
	clin trl expr	.19	.41	.01	.642	-.61	.99		.98	1.02
	ORI sum	.59	.06	.29	.000	.48	.70		.96	1.05
Step 3	(Constant)	-.03	1.96		.989	-3.88	3.83	.14		
	BLV sum	.30	.06	.15	.000	.18	.41		.70	1.43
	CMP sum	-2.74	1.46	-.05	.06	-5.60	.13		.92	1.09
	Gender	-.43	.54	-.02	.428	-1.48	.63		.91	1.10
	Age	-.02	.02	-.02	.44	-.06	.02		.89	1.12
	ethncty	.39	.17	.06	.24	.05	.72		.96	1.04
	rltnshp stat	-.32	.18	-.05	.07	-.66	.02		.97	1.03
	ttl nws src	.15	.16	.02	.343	-.16	.47		.94	1.06
	HPV exper	.20	.30	.02	.510	-.39	.79		.82	1.22
	prst cncr expr	.27	.26	.03	.314	-.25	.79		.74	1.35
	food pois expr	.13	.23	.02	.581	-.33	.58		.78	1.28
	brst cncr expr	-.04	.22	-.01	.846	-.46	.38		.74	1.35
	clin trl expr	.09	.37	.01	.802	-.63	.82		.98	1.02
	ORI sum	.57	.05	.28	.000	.47	.67		.96	1.05
	EFF sum	.53	.03	.44	.000	.47	.60		.73	1.36

Table 9 (cont'd).

Model		B	Std. Error	β	Sig.	95% Confidence Interval for B – Lower Bound	95% Confidence Interval for B – Upper Bound	Step R-sq Change	Collinearity Statistics – Toler.	Collinearity Statistics – VIF
Step 4	(Constant)	-23.94	2.754		.000	-29.35	-18.54	.15		
	BLV sum	.27	.05	.13	.000	.17	.38		.62	1.61
	CMP sum	-.26	1.30	-00	.84	-2.81	2.29		.88	1.14
	Gender	.40	.47	.02	.395	-.53	1.33		.89	1.13
	Age	.03	.02	.03	.15	-.01	.06		.80	1.26
	ethncty	.42	.15	.06	.50	.13	.72		.95	1.05
	rltnshp stat	-.23	.15	-.03	.143	-.53	.08		.95	1.05
	ttl nws src	.19	.14	.03	.19	-.09	.46		.91	1.10
	HPV exper	-.11	.26	-.01	.678	-.63	.41		.81	1.24
	prst cncr expr	.25	.23	.03	.280	-.20	.70		.74	1.36
	food pois expr	.25	.20	.03	.217	-.15	.65		.76	1.31
	brst cncr expr	-.06	.19	-.01	.759	-.43	.31		.74	1.36
	clin trl expr	.26	.32	.02	.417	-.37	.89		.97	1.03
	ORI sum	.46	.05	.22	.000	.37	.55		.85	1.18
	EFF sum	.33	.03	.27	.000	.26	.39		.59	1.69
	NFCvirs	-1.07	.52	-.08	.039	-2.09	-.05		.30	3.29
	NFCcncr	-.38	.62	-.02	.537	-1.59	.83		.51	1.96
	SScncr	-3.46	.59	-.18	.000	-4.62	-2.31		.45	2.25
	SSvirs	-4.11	.52	-.29	.000	-5.14	-3.08		.32	3.15
	NFCbySS	-.53	.20	-.06	.008	-.93	-.14		.95	1.06
	RISK sum	.19	.03	.19	.000	.13	.25		.44	2.27
	NFC sum	.08	.02	.14	.002	.03	.12		.24	4.26
	SS sum	.58	.07	.39	.000	.45	.71		.22	4.51
	virus	4.86	.65	.25	.000	3.59	6.12		.39	2.55
	cancer	5.48	.80	.24	.000	3.91	7.05		.34	2.95

Table 10 focuses on the standardized beta weights and R-squared changes for each step in the model and variable added.

Table 10. Summary of Hierarchical Regression Analysis for Variables Predicting Behavioral Intentions in Reaction to a Fear Appeal Message

	Std. β Step 1	Std. β Step 2	Std. β Step 3	Std. β Step 4	Δ R²
1.Demographics					.17
Article believability index	.40**	.36**	.15**	.13**	
Article comprehension	-.06*	-.05*	-.05	.00	
Gender	.02	.00	-.02	.02	
Age	.01	.00	-.02	.03	
Ethnicity	.03	.04	.06	.06	
Relationship status	-.01	-.02	-.05	-.03	
News sources used in a week	.07*	.04	.02	.03	
HPV experience	.01	.02	.02	-.01	
Prostate cancer experience	.05	.03	.03	.03	
food poisoning experience	.02	.02	.02	.03	
breast cancer experience	-.01	-.02	-.01	-.01	
clinical trial experience	.01	.01	.01	.02	
2. Outcome involvement					.08
Outcome-Relevant Involvement index		.29**	.28**	.22**	
3. Efficacy					.14
Perceived Efficacy index			.44**	.27**	
4. Saturated model					.15
Need For Cognition by virus interaction				-.08*	
Need For Cognition by cancer interaction				-.02	
Sensation Seeking by cancer interaction				-.18**	
Sensation Seeking by virus interaction				-.29**	
Need for Cogn. by Sens. Seeking interaction				-.06*	
Perceived Risk				.19**	
Need For Cognition				.14*	
Sensation Seeking				.39**	
Virus message condition				.25**	
Cancer message condition				.24**	

* = < .05; ** = < .001

The final step for behavioral intention accounted for 53 percent of the variance (adjusted R^2) (F (24, 1065) = 52.04, p < .001, using the hierarchical method). In addition, the Durbin-Watson test statistic for error multicollinearity returned a value of 2.02, a result quite close to 2.00 that strongly supports the notion that the assumption of

independent errors has been met. The assumption of not having variable multicollinearity

is also upheld, according to the variance inflation factor and tolerance results. VIF

outcomes should be less than 10, and no number in this regression approaches that level.

Numbers greater than 10 indicate that the independent variables are highly correlated

with one another (Field, 2005; Gaur & Gaur, 2006). In this analysis, the only results

higher than two are for interaction terms that should have some level of collinearity by

definition, meaning all variables are well within acceptable VIF ranges. Tolerance terms,

which are the inverse of VIF terms, are also well within the acceptable range. Typically, a

value below 0.1 indicates a serious problem (Hinton, Brownlow, McMurray, & Cozens,

2004). The lowest number here for a non-interaction term is .62, and even the interaction

terms are greater than 0.1.

In this model, both outcome-relevant involvement and perceived efficacy were

significant predictors of behavioral intention, explaining 8 percent and 14 percent of the

variance, respectively. Other variables also showed significant relationships with the

dependent variable. Particularly noteworthy were scores on the believability index,

perception of personal threat, sensation seeking, and treatment conditions. These

connections are discussed further in the following section.

Moving backward through the research model, regression number two employed

outcome-relevant involvement as the dependent variable. Again, step one used

demographic and personal information as control variables. Step two contained perceived

threat, the variable expected to have a direct relationship with outcome-relevant

involvement. The final block of variables again included all other variables used in the

course of this research to measure every possible path to the dependent variable.

Each step of the hierarchical regression resulted in significant R-squared changes, F-tests, and beta weights. The R^2 change, F statistics, and p value results of the regression are presented in Table 11.

Table 11. Hierarchical Regression Analysis for Outcome-Relevant Involvement

Model	DF	R-Sq Change	F	P value
1. Demo	12	.04	4.15	<.001
2. Risk	1	.05	9.00	<.001
3. Others	9	.06	8.71	<.001

1: (Constant), clinical trial experience, HPV experience, believability index sum, relationship status, ethnicity, total news sources consumed each week, gender, article comprehension index sum, age, food poisoning experience, breast cancer experience, prostate cancer experience
2: Model 1 plus Perceived Risk index sum
3: Model 2 plus the Need For Cognition by Sensation Seeking interaction term, the Need For Cognition by article subjects interaction terms, the Sensation Seeking by article subjects interaction terms, the Need For Cognition index sum, the Sensation Seeking index sum, and article subjects

More detailed information about beta weights, standard errors, constants, and standardized betas for each variable are in Tables 12 and 13.

Table 12. Hierarchical Regression Analysis for Outcome-Relevant Involvement

Model		B	Std. Error	β	Sig.	95% Confidence Interval for B		Step R-sq Change	Collinearity Statistics	
						Lower Bound	Upper Bound		Toler.	VIF
Step 1	(Constant)	8.01	1.14		.00	5.77	10.25	.04		
	BLV sum	.13	.03	.13	.00	.07	.19		.93	1.08
	CMP sum	-.85	.88	-.03	.34	-2.58	.88		.92	1.09
	Gender	.58	.32	.06	.07	-.06	1.21		.92	1.09
	Age	.01	.01	.02	.63	-.02	.03		.89	1.12
	ethncty	-.12	.10	-.03	.26	-.32	.09		.96	1.04
	rltnshp stat	.16	.11	.05	.13	-.05	.37		.98	1.02
	ttl nws src	.30	.10	.10	.00	.11	.49		.95	1.05
	HPV exper	-.14	.18	-.03	.45	-.50	.22		.82	1.22
	prst cncr expr	.29	.16	.06	.07	-.02	.60		.74	1.35
	food pois expr	-.03	.14	-.01	.81	-.31	.24		.78	1.28
	brst cncr expr	.11	.13	.03	.42	-.15	.36		.74	1.35
	clin trl expr	-.09	.22	-.01	.69	-.53	.35		.98	1.02

Table 12 (cont'd).

Model		B	Std. Error	β	Sig.	95% Confidence Interval for B		Step R-sq Change	Collinearity Statistics	
						Lower Bound	Upper Bound		Toler.	VIF
Step 2	(Constant)	5.56	1.15		.00	3.30	7.81	.05		
	BLV sum	.05	.03	.06	.08	-.01	.11		.84	1.19
	CMP sum	-.11	.86	.00	.90	-1.80	1.58		.91	1.10
	Gender	.63	.31	.06	.05	.01	1.24		.92	1.09
	Age	.01	.01	.04	.25	-.01	.04		.89	1.13
	ethncty	-.08	.10	-.02	.44	-.28	.12		.96	1.04
	ritnshp stat	.12	.10	.03	.25	-.08	.32		.98	1.03
	ttl nws src	.31	.09	.10	.00	.12	.49		.95	1.05
	HPV exper	-.16	.18	-.03	.36	-.51	.18		.82	1.22
	prst cncr expr	.30	.16	.06	.06	-.01	.60		.74	1.35
	food pois expr	-.02	.14	-.01	.89	-.29	.25		.78	1.28
	brst cncr expr	.09	.13	.02	.48	-.16	.34		.74	1.35
	clin trl expr	-.09	.22	-.01	.67	-.52	.33		.98	1.02
	RISK sum	.12	.02	.25	.00	.09	.15		.90	1.12
Step 3	(Constant)	1.34	1.81		.46	-2.21	4.89	.06		
	BLV sum	.02	.03	.02	.57	-.04	.08		.77	1.30
	CMP sum	-.27	.85	-.01	.75	-1.95	1.40		.88	1.14
	Gender	.66	.31	.06	.03	.06	1.27		.89	1.12
	Age	.03	.01	.06	.05	.00	.05		.80	1.24
	ethncty	-.06	.10	-.02	.57	-.25	.14		.95	1.05
	ritnshp stat	.12	.10	.03	.24	-.08	.32		.96	1.05
	ttl nws src	.27	.09	.09	.00	.09	.45		.92	1.09
	HPV exper	-.19	.17	-.03	.28	-.53	.15		.81	1.24
	prst cncr expr	.24	.15	.05	.12	-.06	.53		.74	1.36
	food pois expr	.04	.13	.01	.78	-.23	.30		.76	1.31
	brst cncr expr	.05	.12	.01	.67	-.19	.29		.74	1.36
	clin trl expr	-.05	.21	-.01	.81	-.47	.36		.97	1.03
	RISK sum	.18	.02	.37	.00	.14	.22		.48	2.08
	NFCvirs	-1.11	.34	-.17	.00	-1.77	-.44		.31	3.24
	NFCcncr	-.55	.40	-.05	.17	-1.35	.24		.51	1.96
	SScncr	.00	.39	.00	1.00	-.76	.76		.45	2.23
	SSvirs	-.10	.34	-.02	.77	-.78	.57		.32	3.12
	NFCbySS	.07	.13	.02	.61	-.19	.33		.95	1.05
	NFC sum	.05	.02	.18	.00	.02	.08		.24	4.22
	SS sum	.05	.04	.06	.29	-.04	.13		.22	4.46
	virus	-2.71	.40	-.29	.00	-3.48	-1.93		.45	2.22
	cancer	-1.87	.52	-.17	.00	-2.88	-.85		.35	2.84

Table 13. Summary of Hierarchical Regression Analysis for Variables Predicting Outcome-Relevant Involvement in Reaction to a Fear Appeal Message

	Std. β Step 1	Std. β Step 2	Std. β Step 3	Δ R²
1.Demographics				.04
Article believability index	.13**	.06	.02	
Article comprehension	-.03	.00	-.01	
Gender	.06	.06*	.06*	
Age	.02	.04	.06*	
Ethnicity	-.03	-.02	-.02	
Relationship status	.05	.03	.03	
News sources used in a week	.10*	.10*	.09*	
HPV experience	-.03	-.03	-.03	
Prostate cancer experience	.06	.06	.05	
food poisoning experience	-.01	-.01	.01	
breast cancer experience	.03	.02	.01	
clinical trial experience	-.01	-.01	-.01	
2. Perceived Risk				.05
Perceived Risk index		.25**	.37**	
3. Saturated model				.06
Need for Cognition by virus interaction			-.17*	
Need for Cognition by cancer interaction			-.05	
Sensation Seeking by cancer interaction			.00	
Sensation Seeking by virus interaction			-.02	
Need for Cogn. by Sens. Seeking interaction			.02	
Need for Cognition			.18*	
Sensation Seeking			.06	
Virus message condition			-.29**	
Cancer message condition			-.17**	

• = p < .05; ** = p < .001

The final block of variables accounted for a statistically significant 14 percent of the variance (F (22, 1067) = 8.714, p < .001, using the hierarchical regression method) in outcome-relevant involvement, according to the R^2 value. The Durbin-Watson test statistic for error multicollinearity reported a value of 1.931, again an outcome close to two that strongly supports that the assumption of independent errors has been met. Variable multicollinearity was again examined using the variance inflation factor and

tolerance terms. Like the prior regression model, the results here failed to approach the acceptable limits of 10 and 0.1, respectively.

The predicted relationship between perceived threat and outcome-relevant involvement was significant in this model, with threat accounting for 5 percent of the variance in outcome-relevant involvement. Other variables such as news consumption habits and the treatment conditions were also worth noting.

The last regressions in the series involved the predictors for perceived threat. This portion of the analysis took place in two parts. Part one was hierarchical regression to test the prediction that need for cognition would moderate the relationship between message exposure and perceived threat. Part two performed the same function for sensation seeking. Per the Baron and Kenny definition of a moderator (1986), these regressions served to examine the predictions that need for cognition and sensation seeking would effect the strength of the relation between message condition as an independent variable and perceived threat as a dependent variable.

Both models used the control variables as the first step, followed by the message conditions and the continuous variable of interest, either need for cognition or sensation seeking. The final step in both regressions was the interaction terms between the variable of interest and the message conditions. These variables also continue the pattern of making the final step into a saturated model to examine every possible path to the dependent variable.

For the need for cognition regression, each step produced significant R-squared changes, F-scores, and beta weights. These results are presented in Table 14.

Table 14. Hierarchical Regression Analysis for Need for Cognition Interaction

Model	DF	R-Sq Change	F	P value
1. Demogr.	12	.11	10.57	<.001
2. Direct	15	.40	73.69	<.001
3. Interact.	17	.01	67.59	<.001

1: (Constant), clinical trial experience, HPV experience, believability index sum, relationship status, ethnicity, total news sources consumed each week, gender, article comprehension index sum, age, food poisoning experience, breast cancer experience, prostate cancer experience
2: Model 1 plus article subjects and the Need For Cognition index sum
3: Model 2 plus the Need For Cognition by article subjects interaction terms
Dependent Variable: Risk index sum

More detailed information about beta weights, standard errors, constants, and standardized betas for each variable are available in Tables 15 and 16. The final step in this regression accounted for a statistically significant 52 percent of the variance in perceived risk (F (17, 1072) = 67.59, p < .001, using hierarchical regression). Like in prior analyses, various tests of multicollinearity provide evidence that appropriate assumptions were met.

Table 15. Hierarchical Regression Analysis for Need For Cognition Interaction with Treatment Condition on Perceived Threat

Model		B	Std. Error	β	Sig.	95% Confidence Interval for B		Step R-sq Change	Collinearity Statistics	
						Lower Bound	Upper Bound		Toler.	VIF
Step 1	(Constant)	20.52	2.26		.00	16.09	24.95	.11		
	BLV sum	.64	.06	.32	.00	.52	.75		.93	1.08
	CMP sum	-6.13	1.75	-.11	.00	-9.56	-2.71		.92	1.09
	Gender	-.41	.64	-.02	.52	-1.66	.84		.92	1.09
	Age	-.06	.02	-.08	.01	-.11	-.02		.89	1.12
	ethncty	-.31	.21	-.05	.13	-.72	.09		.96	1.04
	rltnshp stat	.33	.21	.05	.12	-.08	.73		.98	1.02
	ttl nws src	-.03	.19	.00	.88	-.40	.35		.95	1.05
	HPV exper	.20	.36	.02	.57	-.50	.91		.82	1.22
	prst cncr expr	-.05	.32	-.01	.87	-.67	.57		.74	1.35
	food pois expr	-.12	.28	-.01	.67	-.66	.43		.78	1.28
	brst cncr expr	.13	.26	.02	.62	-.38	.63		.74	1.35
	clin trl expr	.03	.44	.00	.95	-.84	.90		.98	1.02

Table 15 (cont'd).

Model		B	Std. Error	β	Sig.	95% Confidence Interval for B		Step R-sq Change	Collinearity Statistics	
						Lower Bound	Upper Bound		Toler.	VIF
Step 2	(Constant)	8.23	1.88		.00	4.54	11.93	.40		
	BLV sum	.57	.05	.28	.00	.48	.66		.91	1.10
	CMP sum	-3.63	1.31	-.06	.01	-6.20	-1.06		.90	1.11
	Gender	.30	.48	.01	.52	-.63	1.24		.91	1.10
	Age	-.04	.02	-.06	.01	-.08	-.01		.89	1.13
	ethncty	-.22	.15	-.03	.15	-.52	.08		.96	1.04
	rltnshp stat	.38	.16	.05	.02	.07	.69		.97	1.03
	ttl nws src	.10	.15	.02	.47	-.18	.39		.92	1.09
	HPV exper	.19	.27	.02	.48	-.34	.71		.82	1.22
	prst cncr expr	-.08	.24	-.01	.75	-.54	.39		.74	1.35
	food pois expr	.03	.21	.00	.90	-.38	.43		.78	1.29
	brst cncr expr	.20	.19	.03	.29	-.17	.58		.74	1.35
	clin trl expr	.16	.33	.01	.62	-.48	.81		.98	1.03
	Virus	10.78	.52	.56	.00	9.77	11.80		.64	1.57
	Cancer	17.45	.60	.78	.00	16.28	18.62		.64	1.56
	NFC sum	-.01	.01	-.01	.61	-.03	.02		.89	1.12
Step 3	(Constant)	15.82	2.54		.00	10.84	20.80	.01		
	BLV sum	.56	.05	.28	.00	.47	.65		.90	1.11
	CMP sum	-3.66	1.30	-.06	.01	-6.21	-1.11		.90	1.11
	Gender	.29	.47	.01	.54	-.64	1.21		.91	1.10
	Age	-.05	.02	-.06	.01	-.08	-.01		.89	1.13
	ethncty	-.21	.15	-.03	.16	-.51	.09		.96	1.04
	rltnshp stat	.39	.15	.05	.12	.09	.69		.97	1.04
	ttl nws src	.10	.14	.02	.50	-.18	.38		.92	1.09
	HPV exper	.24	.27	.02	.37	-.29	.76		.82	1.23
	prst cncr expr	-.07	.23	-.01	.77	-.53	.39		.74	1.35
	food pois expr	-.05	.21	-.01	.82	-.45	.36		.77	1.30
	brst cncr expr	.22	.19	.03	.25	-.15	.59		.74	1.35
	clin trl expr	.13	.33	.01	.70	-.51	.76		.98	1.03
	virus	10.75	.51	.56	.00	9.74	11.75		.64	1.57
	cancer	17.41	.59	.78	.00	16.25	18.57		.64	1.56
	NFC sum	-.09	.02	-.17	.00	-.14	-.05		.26	3.85
	NFCvirs	2.69	.60	.13	.00	1.52	3.87		.55	1.81
	NFCcncr	1.87	.50	.14	.00	.88	2.86		.33	3.00

Table 16. Summary of Hierarchical Regression Analysis for Need for Cognition Interaction with Treatment Condition on Perceived Threat

	Std. β Step 1	Std. β Step 2	Std. β Step 3	Δ R²
1.Demographics				.11
Article believability index	.32**	.28**	.28**	
Article comprehension	-.11**	-.06*	-.06*	
Gender	-.02	.01	.01	
Age	-.08*	-.06*	-.06*	
Ethnicity	-.05	-.03	-.03	
Relationship status	.05	.05	.05	
News sources used in a week	.00	.02	.02	
HPV experience	.02	.02	.02	
Prostate cancer experience	-.01	-.01	-.01	
food poisoning experience	-.01	.00	-.01	
breast cancer experience	.02	.03	.03	
clinical trial experience	.00	.01	.01	
2. Direct relationships				.40
Virus article condition		.56**	.56**	
Cancer article condition		.78**	.78**	
Need For Cognition index		-.01	-.17**	
3. Need For Cognition/article interaction terms				.01
Need For Cognition by virus interaction			.13**	
Need For Cognition by cancer interaction			.14**	

* = p < .05; ** = p < .001

The proposed moderating relationship for need for cognition between message exposure and perceived threat was significant, an outcome that will be discussed further in the hypothesis-testing portion of this paper. Other, non-predicted relationships also were significant. These will be discussed at the end of the Results and Discussion section.

A hierarchical regression focused on sensation seeking made up the last of the tests. All three steps in this regression produced significant R-squared changes, F-scores, and beta weights. The results are presented in Table 17, and more detailed information about beta weights, standard errors, constants, and standardized betas is available in Tables 18 and 19. The last step in this regression accounted for 51 percent of the variance in perceived risk (F (17, 1072) = 66.08, p < .001).

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Table 17. Hierarchical Regression Analysis for Sensation Seeking Interaction with Treatment Condition on Perceived Threat

Model	DF	R-Sq Change	F	P value
1. Demogr.	12	.11	10.57	<.001
2. Direct	15	.40	73.71	<.001
3. Interact.	17	.004	66.08	<.001

1: (Constant), clinical trial experience, HPV experience, believability index sum, relationship status, ethnicity, total news sources consumed each week, gender, article comprehension index sum, age, food poisoning experience, breast cancer experience, prostate cancer experience
2: Model 1 plus article subjects and the Sensation Seeking index sum
3: Model 2 plus the Sensation Seeking by article subjects interaction terms
Dependent Variable: Risk index sum

Table 18. Hierarchical Regression Analysis for Sensation Seeking Interaction with Treatment Condition on Perceived Threat

Model		B	Std. Error	β	Sig.	95% Confidence Interval for B Lower Bound	Upper Bound	Step R-sq Change	Collinearity Statistics Toler.	VIF
Step 1	(Constant)	20.52	2.26		.00	16.09	24.95	.11		
	BLV sum	.64	.06	.32**	.00	.52	.75		.93	1.08
	CMP sum	-6.13	1.75	-.11**	.00	-9.56	-2.71		.92	1.09
	Gender	-.41	.64	-.02	.52	-1.66	.84		.92	1.09
	Age	-.06	.02	-.08*	.01	-.11	-.02		.89	1.12
	ethncty	-.31	.21	-.05	.13	-.72	.09		.96	1.04
	rltnshp stat	.33	.21	.05	.12	-.08	.73		.98	1.02
	ttl nws src	-.03	.19	.00	.88	-.40	.35		.95	1.05
	HPV exper	.20	.36	.02	.57	-.50	.91		.82	1.22
	prst cncr expr	-.05	.32	-.01	.87	-.67	.57		.74	1.35
	food pois expr	-.12	.28	-.01	.67	-.66	.43		.78	1.28
	brst cncr expr	.13	.26	.02	.62	-.38	.63		.74	1.35
	clin trl expr	.03	.44	.00	.95	-.84	.90		.98	1.02
Step 2	(Constant)	8.52	2.01		.00	4.57	12.47	.40		
	BLV sum	.57	.05	.28**	.00	.48	.66		.91	1.09
	CMP sum	-3.78	1.31	-.07*	.00	-6.35	-1.21		.90	1.11
	Gender	.27	.48	.01	.58	-.68	1.21		.90	1.11
	Age	-.05	.02	-.06*	.01	-.09	-.01		.82	1.22
	ethncty	-.23	.15	-.03	.14	-.53	.07		.96	1.04
	rltnshp stat	.38	.16	.05	.01	.08	.69		.97	1.03
	ttl nws src	.10	.14	.02	.50	-.18	.38		.95	1.05
	HPV exper	.20	.27	.02	.45	-.33	.73		.81	1.23
	prst cncr expr	-.08	.24	-.01	.74	-.54	.38		.74	1.35
	food pois expr	.03	.21	.00	.90	-.38	.43		.78	1.29
	brst cncr expr	.19	.19	.03	.31	-.18	.57		.74	1.35
	clin trl expr	.16	.33	.01	.63	-.49	.80		.97	1.03
	Virus	10.77	.52	.56**	.00	9.76	11.79		.64	1.57
	Cancer	17.45	.60	.78**	.00	16.28	18.62		.64	1.56
	SS sum	-.02	.03	-.02	.52	-.09	.05		.86	1.16

Table 18 (cont'd).

Model		B	Std. Error	β	Sig.	95% Confidence Interval for B		Step R-sq Change	Collinearity Statistics	
						Lower Bound	Upper Bound		Toler.	VIF
Step 3	(Constant)	11.75	2.27		.00	7.29	16.20	.00		
	BLV sum	.58	.05	.29**	.00	.49	.67		.91	1.11
	CMP sum	-3.87	1.31	-.07*	.00	-6.43	-1.31		.90	1.11
	Gender	.23	.48	.01	.63	-.71	1.17		.90	1.12
	Age	-.05	.02	-.06*	.01	-.09	-.01		.82	1.22
	ethncty	-.21	.15	-.03	.16	-.51	.09		.95	1.05
	rltnshp stat	.39	.16	.05	.01	.08	.69		.97	1.03
	ttl nws src	.09	.14	.01	.54	-.19	.37		.95	1.06
	HPV exper	.22	.27	.02	.41	-.31	.75		.81	1.24
	prst cncr expr	-.06	.24	-.01	.80	-.52	.40		.74	1.35
	food pois expr	-.01	.21	.00	.96	-.41	.39		.77	1.29
	brst cncr expr	.19	.19	.02	.33	-.19	.56		.74	1.35
	clin trl expr	.16	.33	.01	.62	-.48	.81		.97	1.03
	virus	10.79	.52	.56**	.00	9.78	11.80		.64	1.57
	cancer	17.44	.59	.78**	.00	16.27	18.61		.64	1.56
	SS sum	-.18	.06	-.12*	.00	-.31	-.06		.25	4.07
	SSvirs	1.09	.57	.06	.06	-.04	2.22		.49	2.06
	SScncr	1.60	.51	.11*	.00	.59	2.60		.35	2.89

Table 19. Hierarchical Regression Analysis for Sensation Seeking Interaction Terms on Perceived Threat

	Std. β Step 1	Std. β Step 2	Std. β Step 3	Δ R²
1.Demographics				.11
Article believability index	.32**	.28**	.29**	
Article comprehension	-.11**	-.07*	-.07*	
Gender	-.02	.01	.01	
Age	-.08*	-.06*	-.06*	
Ethnicity	-.05	-.03	-.03	
Relationship status	.05	.05	.05	
News sources used in a week	.00	.02	.01	
HPV experience	.02	.02	.02	
Prostate cancer experience	-.01	-.01	-.01	
food poisoning experience	-.01	.00	.00	
breast cancer experience	.02	.03	.02	
clinical trial experience	.00	.01	.01	
2. Direct relationships				.40
Virus article condition		.56**	.56**	
Cancer article condition		.78**	.78**	
Sensation Seeking index		-.02	-.12*	
3. Sensation Seeking/article interaction terms				.00
Sensation Seeking by virus interaction			.06	
Sensation Seeking by cancer interaction			.11**	

* = p < .05; ** = p < .001

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Just as in the need for cognition analysis, almost all of the variance is due to the message conditions. A quick glance at the relevant tables shows that for both sensation seeking and need for cognition account, interactions account for only around one percent of the variance in perceived risk. Initial consideration may lead one to conclude that neither interaction term is of particular importance.

Such a conclusion would be hasty and out of context, however (Aiken & West, 1991). Thorough examination across social science fields has demonstrated that the literature on moderator variables is consistent in reporting small effect sizes for interaction terms (Chaplin, 1991, 1997). Reviewing three broad areas of psychology, in fact, Chaplin found that observed effect sizes for interactions accounted for about one percent of the variance of outcome variables (Chaplin, 1991). Making things more challenging for researchers, to even detect effects of this size, large samples are a necessity. Significant sample sizes will help account for potential problems such as measurement error (Aiken & West, 1991). Such experience and knowledge leads to the possibility that the interaction effects are considerably more noteworthy than the numerical result would indicate and that the two variables in question—sensation-seeking and need for cognition—may be effective moderators of perceived threat. The results and understanding of interaction terms in general certainly indicates that two here merit further examination in other research projects.

Hypothesis testing

Control variables

All relationships in this analysis were tested with various demographic and media-use questions as control variables. The items considered as control variables included typical

demographic items such as age, ethnicity, gender, and relationship status. Other variables included here were personal or other experiences with the health topics covered by the treatment articles, how believable respondents found the treatment articles, how well people did on the comprehension index concerning the information contained in the articles, and also individual news consumption habits. News consumption was defined as how many news sources a respondent used on daily basis over the course of each week.

Several control variables had significant relationships with the dependent variables. Only those relationships that were consistent across regression steps were noted, however. Several variables were statistically significant during a certain step but quite far from significance at others.

Scores on the believability index related positively to scores on the behavioral intention and perceived threat indices. How believable an individual found the article influenced how much the individual intended to alter his/her behavior such that the behavioral intention score would increase a noteworthy amount for every standard deviation that the believability score changed. The amount of change, however, varied according to the other variables entered into the analysis, from .40 (β = .40, p < .001) in the initial step to almost a third of that (β = .13, p < .001) in the final step with all the variables added. The regression focused on perceived threat as the dependent variable showed the same statistically significant relationship for believability (from β = .32, p < .001 in step 1 to β = .28, p < .001 in step 3).

Comprehension of the articles—as measured by the four true/false items—also influenced two of the dependent variables. Comprehension had a positive, statistically significant relationship with outcome-relevant involvement (β = .10, p = .002) across its

steps and a negative, statistically significant relationship with perceived threat ($\beta = -.11$, p < .001 in step 1 to $\beta = > -06$, p = .005 in step 3).

Age produced similar relationships to comprehension when it came to outcome-relevant involvement and perceived threat as dependent variables. Age had a small, statistically significant effect on outcome-relevant involvement in the final step of that regression ($\beta = .06$, p = .05) and a negative, statistically significant relationship on perceived threat ($\beta = -06$, p = .01).

Outcome-relevant involvement also linked to a small, negative, statistically significant effect for gender ($\beta = -.06$, p = .05) and a small, positive, statistically significant effect for increased news consumption ($\beta = .10$, p = .002). Other variables displayed tenuous relationships with the dependent variables, appearing at certain steps or changing considerably across steps.

For example, the variable comprehension check displays a statistically significant role as a predictor of behavioral intention ($\beta = -.06$, p = .03) in step one of that regression, but the relationship changes dramatically by the final step of that examination ($\beta = -.004$, p = .84). Believability performs similarly in the first step of the outcome-relevant involvement regression ($\beta = .13$, p < .001). As other variables entered future steps, however, the relationship changes to become far from statistically significant ($\beta = .02$, p = .57).

Media use habits also had a statistically significant relationship as a predictor of behavioral intention ($\beta = .07$, p = .02) in the first step of that regression. By step four of that regression, media use becomes less of a predictor and leaves the range of statistical

significance (β = .03, p = .19). Being that these relationships for the control variables were not predicted, more analysis and future research will be necessary to explore them.

Hypotheses

H1: Higher perceived efficacy will associate positively with an action-oriented outcome.

H1 predicted that perceived efficacy would be positively associated with behavioral intention. Results show that efficacy had a positive effect on behavioral intention (β = .44, p < .001, ΔR^2 = .14), as hypothesized. H1 was supported. For every standard deviation increase in perceived efficacy, behavioral intention will rise by .44 of a standard deviation.

Just as prior research has reported, this outcome supports the idea that increasing a person's belief in his own abilities can be an effective means of persuasion. If an individual perceives that a particular recommended behavior will be effective and that she can complete this behavior, she'll be more likely to undertake that behavior. A woman will be more likely to follow a message promoting mammograms if she believes in the effectiveness of those tests and in her ability to get them consistently.

H2: Higher perceived threat will associate positively with higher outcome-relevant involvement.

H2 predicted that higher levels of perceived threat would be a predictor of increased levels of outcome-relevant involvement. Perceived threat was a statistically significant predictor of outcome-relevant involvement (β = .25, p < .001, ΔR^2 = .05 in the first entry). The standardized beta weight of .25 indicates that for each single standard

deviation change in perceived threat, outcome-relevant involvement will in turn change .25 of a standard deviation. These data are consistent with the predictions of H2.

Practically speaking, this result supports the idea that as individuals feel threatened by some particular topic, they will increasingly perceive the outcomes of the topic as important. For example, the topic of diabetes could become more threatening to a person as he recognizes risk factors in his life such as advancing age, weight gains, and some blurred vision. As he perceives diabetes to be an increasing threat to his well-being, his interest in the outcome of diabetes care will also increase.

H3: Higher outcome-relevant involvement will associate positively with higher behavioral intention.

Based upon prior compliance-gaining research, H3 predicted that higher levels of outcome-relevant involvement would lead to higher levels of behavioral intention. As shown in the hierarchical regression Tables 8-10, outcome-relevant involvement was significantly related to positive change in behavioral intention ($\beta = .29$, $p < .001$, $\Delta R^2 = .08$), indicating that outcome-relevant involvement is a useful predictor for behavioral intention and explains eight percent of its variance. Thus, H3 was supported.

For health communication researchers and practitioners, this presents another avenue to change individuals' behavior. If people's interest in the results of a situation leads to more intent to change behaviors, message designers could produce more effective content by engaging the audience and promoting a connection to the outcome of a health issue. Pushing a personal connection to the conclusion of some health risk affords another opportunity to encourage individuals to adopt healthy behaviors.

H4: Sensation seeking will moderate the relationship between message condition and threat perception. Specifically, those high in sensation seeking will report less perceived threat than those low in sensation seeking.

H4 predicted that the relationship between message condition and respondents' threat perceptions would be moderated negatively by sensation seeking. Those high in sensation seeking will report less perceived threat than those low in sensation seeking and vice versa when exposed to arousing messages. The regression offers evidence counter to this hypothesis in the form of statistically significant, positive R-squared change results $(F (17, 1072) = 66.08, p < .001, \Delta R^2 = .004)$ and significant or near-significant positive outcomes for the message condition/sensation seeking interaction terms (sensation seeking by cancer article interaction with perceived threat: $\beta = .11, p = .002$; sensation seeking by virus article interaction with perceived threat: $\beta = .06, p = .06$). Thus, H4 was not supported as the hypothesis predicts a negative moderation effect for sensation seeking, and the data point to a positive influence.

This hypothesis predicted that people requiring considerable stimulation would be less affected than average by a message intended to create the perception of a health threat. The findings, though, failed to support this idea. One obvious reason why this hypothesis may not have matched with the data is the effect of the sample used in this study and its influence on the data. Individuals truly high in sensation seeking are known to be risk-takers likely to be involved with extreme sports, substance abuse, and other physically stimulating activities. High sensation-seekers are not expected to be individuals involved with potentially less thrilling, mundane activities such as Internet surfing; yet, such online time is obviously a prerequisite to completing the survey

instrument for this project. Furthermore, it is also possible that members of the online research panel used to collect data are more likely than average to spend time on Internet activities, potentially pushing them further from being individuals being truly high in sensation seeking. This is not at all to say that World Wide Web usage and stimulating experiences are mutually exclusive, only that the sedentary nature of most online activities could be a limiting factor in the number of truly high-sensation-seeking individuals.

Respondents may have portrayed themselves as high in sensation seeking when completing those specific survey items. At the same time, since they were not truly high in the need for extreme stimulation, they did respond to other items as a person truly high in sensation seeking would. Perhaps they answered the questions about need for stimulation in a certain way to make themselves appear more adventurous or exciting but did not continue answering as a person needing much stimulation because, in fact, that was not the case.

In other words, a respondent may have answered the sensation seeking questions in a way that makes that person appear to be adventurous or a risk-taker. Such responses may match well with that individual's self-image. However, when questions come up concerning actual reactions to presented experimental conditions, that same person may revert to his/her more realistic, more modest view of risk-taking. The differences in mind-set when answering the two surveys could prevent the expected relationship from developing. At the outset, the respondent could be trying to portray an exciting self-image. In response to the questions about the experiment, that same respondent could be answering more realistically based upon the recent happening of the experimental

treatment—reading a newspaper article, in this case. It's a conflict between a hypothetical personal ideal and a real-life happening.

In addition, people legitimately high in sensation seeking are more likely to be outdoors, away from their computers, competing in extreme sports or other strenuous activities. Other high sensation-seekers report spending free time engaging in risky sexual or substance-abuse behaviors, again leaving them less likely to remain calmly seated in front of a computer taking a survey. These groups may of course also overlap.

Other research has also noted that individuals high in sensation seeking are difficult to reach through all research methodologies, regardless of the subject population. While this particular project failed to find results consistent with the prediction that sensation seeking would reduce fear messages' influence on perceived threat, other factors may have limited the ability of this research to test the prediction. Future research may be able to more effectively target individuals high in sensation seeking and find more valid results.

H5: Need for cognition will moderate the relationship between message condition and threat perception. Specifically, those high in need for cognition will report greater perceived threat than those low in need for cognition.

The fifth hypothesis predicts that need for cognition will act as a moderator in the relationship between message condition and threat perception. According to this hypothesis, those high in need for cognition will report greater perceived threat than those low in need for cognition and vice versa.

Data indicate that need for cognition does interact with the message condition's relationship with threat perception. The interaction terms of need for cognition accounted

for a one percent of the variance in perceived threat (F (17, 1072) = 67.59, p < .001, ΔR^2 = .01), supporting H5. In addition, the standardized beta weights for both of the interaction terms for need for cognition and message condition were statistically significant (β = .13, p < .001 for the virus article and need for cognition; β = .14, p < .001 for the cancer article and need for cognition). As discussed earlier, this R-squared change may appear small but is, in fact, in line with expectations based upon prior social science research (Aiken & West, 1991; Chaplin, 1991). Need for cognition served to moderate a portion of the relationship between the fear appeal messages and perceived threat.

Results indicate that message designers would benefit from considering the thinking style of their audiences. Individuals likely to logically process information should be approached with fear appeals differently than people unlikely to rationally consider some message. A fear appeal presented to someone that likes to think deeply will not be mentally processed in the same way as an identical message shown to someone not interested in putting forth mental effort. When it is possible to customize messages along the lines of thinking styles, campaign designers could benefit from doing so. This customization is most likely to be possible during interpersonal communication or during situations using adaptable digital media that can adjust according to user responses.

Just as Figure 1 portrayed the research model, Figure 2 represents the standardized beta weights according to the hypothesis testing results. Each path is statistically significant at the p < .001 level and provides the beta weights from a series of hierarchical regression analyses. The values are not the product of structural equation modeling or path analysis.
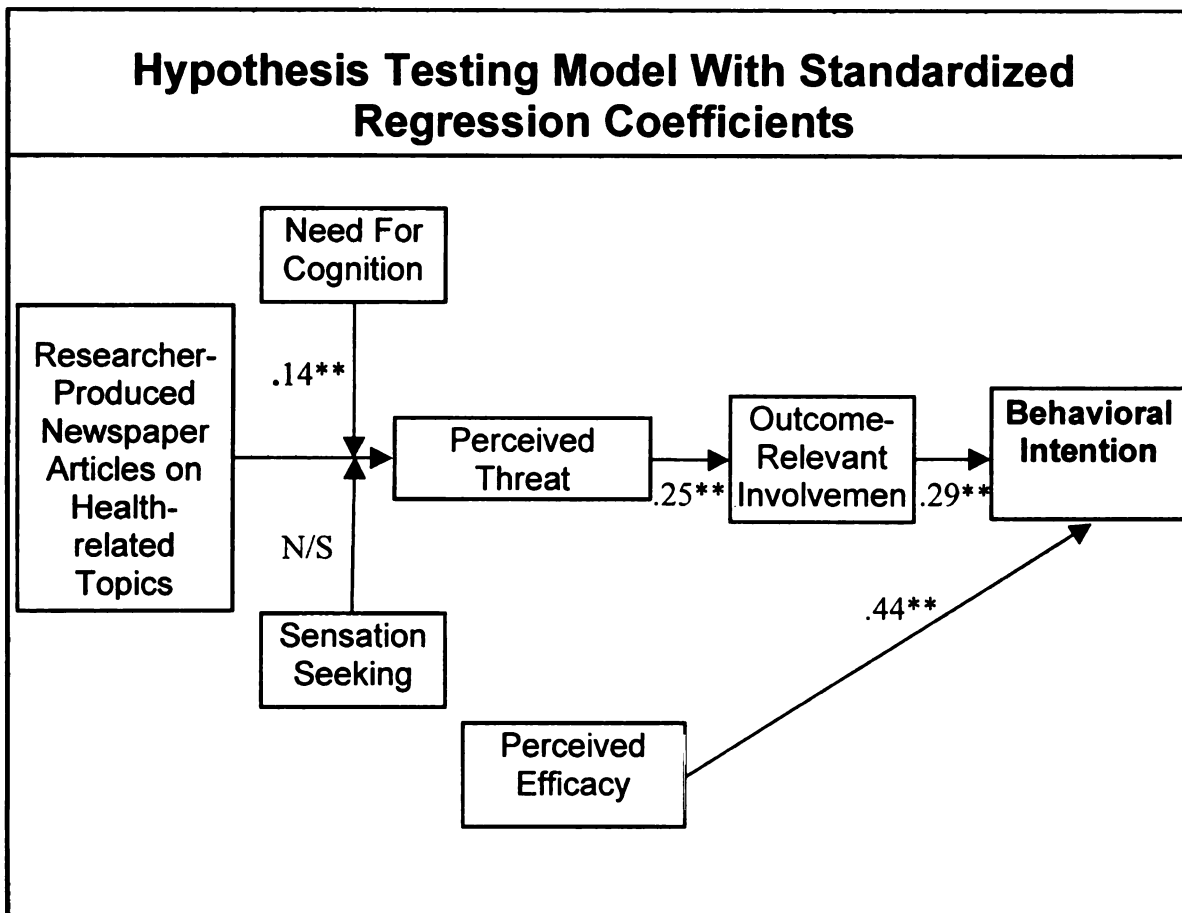
Figure 2. Hypothesis Testing Model With Standardized Regression Coefficients
** p < .001

Non-predicted relationships

The regression analyses also produced statistically significant results for a number of

not-predicted relationships between variables in the predicted model. All of the values are

viewable in the previously mentioned tables of regression results. These relationships are

described here for the purpose of adding to future research. This project had no

theoretical reasons to expect these relationships, but ensuing scholarship may develop

theories that match with the outcomes.

Behavioral intention as a dependent variable had a noteworthy number of non-

hypothesized, significant predictors. For example, individuals' news consumption habits

(β = .07, p = .02) and perceived believability of the experiment's news content (β = .40, p

< .001) both were significant predictors of behavioral intention, with believability being a particularly strong predictor. Thus, the more that readers accepted the news stories as accurate, the more likely they were to adopt the behaviors recommended in the text. In addition, the likelihood of taking on the suggested behavior was influenced by how often individuals read newspapers, watched TV news, scanned the Internet for information, or listened to the radio.

The dummy variables for the treatment article subject areas were significant predictors (β = .25, p < .001 for "virus" and β = .24, p < .001 for "cancer"). Several of the variables from the initial stages of the research model were as well. Perceived threat (β = .19, p < .001), need for cognition (β = .14, p < .001), and sensation seeking (β = .39, p < .001) all had direct relationships with behavioral intention. Along with the believability of the news content and how intensely a person followed the news, other unpredicted factors affected plans to take on suggested behaviors. Simply reading the fabricated news stories about viruses and cancers influenced individual intentions to undertake behaviors. Perceiving a threat from a medical risk message also strongly predicted a person's designs on behavior change. In addition, intentions to modify personal behaviors were influenced by a preference for thinking in a rational manner and processing factual information (need for cognition). Somewhat contradictorily, a taste for remarkably stimulating experiences (sensation seeking) additionally led to an increase in the likelihood that an individual would report plans to follow the suggestions included in the fabricated AP article.

Several of the interactions among these variables were statistically significant predictors of behavioral intention, too, all in a negative direction. Need for cognition's

interaction with the cancer article message condition negatively related to behavioral intention (β = -.08, p = .04), as did the sensation seeking by cancer (β = -.18, p < .001) and virus interactions (β = -.29, p < .001). The need for cognition by sensation seeking interaction also was a negative predictor of the dependent variable, albeit a small one (β = -.06, p = .01). Altogether, these non-predicted relationships accounted for 15 percent of the variance (R-squared) in behavioral intention. Such findings offer additional possibilities in the way that individual traits could influence people's intentions to change their personal behaviors. If a preference for rational thinking (need for cognition) and a desire for significant stimulation (sensation seeking) affect the strength of the relationship between fear appeal messages and individual responses to those messages, campaign designers need to account for such things when possible. An individual's thought process or personal preferences may partially determine the effectiveness of health communication content, making them worth consideration.

Outcome-relevant involvement had its share of non-hypothesized predictor variables, albeit not as many as behavioral intention. Respondent news consumption was a predictor of outcome-relevant involvement (β = .10, p = .002), as were need for cognition (β = .18, p = .003), the virus treatment condition (β = -.29, p < .001), and the cancer treatment condition (β = -.17, p < .001). While need for cognition's interaction with the cancer article condition was a predictor of behavioral intention, the need for cognition/virus article condition was a similar predictor of outcome-relevant involvement (β = -.17, p = .001). The message conditions and the interactions, however, were all negative predictors of interest in the outcomes of health matters.

Like respondents' plans to adopt suggest behaviors (behavioral intention), their

engagement with the outcome of a health issue (outcome-relevant involvement) was

influenced by a number of non-predicted factors. Once again, the more they accepted the

accuracy of news stories and the more often they followed the news, the more likely

respondents were to take an interest in the conclusion of health issue. In addition, a

preference for rational thinking (need for cognition) also led to an interest in health

outcomes, as did exposure to the articles on viruses and cancers. Evidence-based thinking

also influenced the strength of the relationship between exposure to the articles on viruses

and concern for health outcomes.

Two other variables that didn't play a role in predicting behavioral intention were

statistically significant predictors of outcome-relevant involvement. While not large

predictors, both gender (β = .06, p = .03) and age (β = .06, p = .05) were consistent across

steps of the hierarchical regression. The small effects of gender and age on interest in the

results of a health issue may indicate the use of considering these factors when

developing a fear appeal message. If different age and gender groups will react

differently, message designers could increase campaign effectiveness by considering

demographics.

The last dependent variable in the series of regressions, perceived threat, additionally

had several unexpected predictors. Believability was once again a significant predictor (β

= .28, p < .001). Comprehension proved to have a small but statistically significant

relationship with the dependent variable (β = -.06, p = .01), and age did as well (β = -.06,

p = .01). Age, in fact, had the opposite relationship with perceived threat that it did with

outcome-relevant involvement, acting as a small, negative predictor here and a small,

positive one in the prior analysis. Sensation seeking was also shown to be a small

negative predictor or perceived threat (β = -.12, p = .01)

Just like for intention to adopt a behavior and an interest in health outcomes,

respondents' perceptions of being threatened by a health issue were influenced by how

much they believed the presented newspaper article. How well they retained some

information from the article also affected their perceptions of threat, only its influence

was negative. Retaining more information from the article slightly worked against the

perception of threat. Age was also a negative predictor of perceived threat here, the

opposite relationship it had to feeling involved in the outcome of a health issue (outcome-

relevant involvement). A desire for heightened stimulation (sensation seeking) had a

similar effect, working against a message's ability to create a threat.

Chapter 6. Summary and Conclusions

Health messages are consistently available to the public through a number of media. Television news, print reporters, and Internet journalists, among others, supply the latest medical information. The mass media often provide educational content and serve as health educators, encouraging individuals to adopt more positive and pro-active health behaviors.

In this role, mainstream media counteract a realm of negative health influences. Certain product advertising, for example, promotes negative behaviors such as smoking or frequent fast food consumption. In addition, lack of information or repetitious misinformation encourages the continuance of damaging behaviors. When added to the personal challenges inherent in altering lifestyle habits, negative advertising and the challenge of finding accurate information makes positive change even more demanding to maintain long term.

However, public health advocates can also employ mass media to overcome such harmful influences. The ability of pro-social, mediated messages to carry out this public health task can be improved by the theories and message-design strategies developed by health communication researchers. Theoretically driven messages based upon prior research have the greatest chance for success. Effective messages can promote positive health behaviors and encourage individuals to make better healthcare decisions. Well-designed messages can increase the likelihood of individuals adopting the recommended behaviors. This dissertation research attempts to further health communication research by contributing theoretically and practically to knowledge on the how individuals react to

health education messages. Comprehending responses to messages will in turn encourage more effective design processes and message applications. To that end, this chapter will separate into sections covering the theoretical and practical implications of this research, following a brief review of the project's goals. The two implication sections will also address the goals noted below as appropriate.

The stated goals of the project covered three aspects of fear appeal research. First, this dissertation tested the Extended Parallel Process Model in a communication context different from prior uses. News articles were employed to test the theory in a different message environment, rather than using the brochures, posters, or educational videos employed in prior fear appeal experiments. The examination of this context was carried out through the testing of the first two hypotheses, restated here:

H1: Higher perceived efficacy will associate positively with an action-oriented outcome.

H2: Higher perceived threat will associate positively with higher outcome-relevant involvement.

Second, several variables from persuasion research were added to the Extended Parallel Process Model and applied in a number of health messages. If effective, these variables could increase the effectiveness of health news on behavioral intention to undertake pro-active health behaviors. The additions were tested in the examination of the hypotheses three to five, restated here:

H3: Higher outcome-relevant involvement will associate positively with higher behavioral intention.

H4: Sensation seeking will moderate the relationship between message condition and threat perception. Specifically, those high in sensation seeking will report less perceived threat than those low in sensation seeking.

H5: Need for cognition will moderate the relationship between message condition and threat perception. Specifically, those high in need for cognition will report greater perceived threat than those low in need for cognition.

The third goal was to reduce the scientific impact of less effective design and measurement commonly observed in prior fear appeal research. Decreasing the effect of errors can allow for more precise understanding of how individuals process and react to health information. This goal was not tested directly through a specific hypothesis. Rather, it was an essential part of the project's development and implementation best viewed through comparing results to prior research.

The outcomes of testing the hypotheses and improving experimental design will help healthcare practitioners, public relations professionals, and journalists predict how people are likely to respond to behavior-change messages. Understanding the results will aid in the development of more effective messages and better predictions of behavioral outcomes. The implications also extend into any other context that involves altering behavior or attitudes through mediated persuasive messages.

Theoretical Implications

Fear appeals in news content

The first goal of this dissertation was to extend and test the Extended Parallel Process Model in a news media context, opening possibilities for examining the rigor of the EPPM. Prior research employed primarily brochures and posters as educational media, with a few projects using videos. The use of news content either real or simulated is rare. This is despite the fact that so much of the information individuals receive each day comes through the channel of mainstream media. Testing the EPPM in this environment

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showed that its predictions and expectations were applicable even in a news setting and that the context merits further research.

Such knowledge is made even more important when considering the volume of news consumers and the importance of studying how they access information. Millions of individuals each day depend on mainstream media such as newspapers and magazines to provide updates on the latest in health research. Consumers also turn to media for recommendations derived from the most recent work of scientists and government agencies. The potential influence of effective, mediated persuasive messages is staggering and relatively unexamined.

Additional persuasion variables in the Extended Parallel Process Model

The second goal of the dissertation was to add to the theoretical model of the EPPM and examine the potential influence of several variables from the persuasion literature. Specifically, need for cognition was predicted to positively moderate the relationship between message conditions and perceived threat, and sensation seeking was expected to moderate the same relationship negatively. Perceived threat was then predicted to positively affect outcome-relevant involvement. In turn, outcome-relevant involvement was expected to positively influence behavioral intention, the ultimate dependent variable. Perceived efficacy was also predicted to positively influence behavioral intention.

Five newspaper articles were developed according to the requirements of the EPPM, each with an element intended to promote perceived threat and perceived efficacy. The five articles were collapsed into three groups because of similarities in content. This

design still ensured the existence of multiple message categories. Using multiple messages increased the validity of the study because significant findings due to the individual article topic were less likely to be a plausible explanation for the outcomes. The predicted relationships consistent with the EPPM and the additional variables were supported by the data in all but one case, the interaction of sensation seeking and message condition.

Increased level of perceived threat was a significant predictor of outcome-relevant involvement, which in turn was a significant predictor of behavioral intention. In addition, perceived efficacy was a solid predictor of behavioral intention, accounting for 14 percent of the variance. Two moderators were also predicted in the hypotheses. Need for cognition and sensation seeking were expected to moderate the relationship between the message conditions and perceived threat. Need for cognition produced statistically significant interaction effects. Although the effects are not numerically large, they are in line with the realistic expectations of moderator effects found in other social science research.

Sensation seeking had statistically significant effects for the highest-threat message condition and near-significant effects for the moderate condition, but both of these outcomes were in the opposite direction predicted. A negative relationship was predicted, but positive relationships were produced in this portion of the analysis.

Individual desire for stimulating experiences did not influence thinking about the experimental newspaper articles in the way expected. The initial prediction was that people driven by an interest in exciting events would be less influenced by fear appeals. The results, however, showed the opposite. Those craving invigorating happenings

actually found the newspapers to be more threatening than those not showing as much interest in stimulating experiences.

Design and measurement issues

The third goal was to improve the level of measurement and experimental design from prior fear appeal research. The improvements happened in two ways. The first development involved carefully adapting and pilot testing previously used instruments to achieve higher Cronbach's alpha reliability scores. Reduced alpha scores have been common to a number of instruments used in this research. Perceived severity, susceptibility, self-efficacy, and response efficacy all have typically reported alphas in the high .7s, for example. While this may be a commonly acceptable level, higher alpha reliability improves measurement and thus the accuracy of statistical results. The measurement instruments in this project improved their Cronbach alpha reliabilities almost .09 over their normal results to .88 on average. This includes one new index— Park et al.'s outcome-relevant involvement index—that actually went down from its prior use and pilot testing for this project. Without that one instrument, the others increased an average of .10.

The second area of intended improvement comes from having multiple messages capable of inducing multiple levels of perceived threat, a suggestion put forth in Boster and Mongeau's meta-analysis (1984). In their work, studies with more levels of fear manipulation reported stronger relationships between perceived threat and the dependent variable. Despite this observation, few projects have moved beyond employing low- and high-fear conditions, meaning the relationships they are reporting may not actually representative of the real relationships. In this dissertation, for example, the perceived

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threat-behavioral intention correlation is .51 (p < .01). The comparable correlations in the Witte and Allen meta-analysis (the only one computing these relationships) came out to .11.

Along similar lines, the perceived efficacy-behavioral intention correlation in this study was significantly greater than in prior research. Witte and Allen (2000) report efficacy correlations with the common dependent variables as being between .12 and .17. Here, the perceived efficacy correlation with the dependent variable is .52 (p < .01). This further supports the previously found strong relationships between perceived efficacy and the common fear appeal dependent variables. While one can find much disputing research about the efficacy of fear appeals and dependent variables, most research endorses the relationship between efficacy and adherence to suggested outcomes.

Practical Implications

Fear appeals in news content

As discussed prior, the first area of emphasis for this project was to examine the Extended Parallel Process Model when employed in news content to look for ways of improving mediated health communication efforts and public health campaigns.

Health message designers would be well advised to consider how mainstream media treat their messages. Pro-social organizations can only rarely deliver their own messages unfiltered, making it essential to consider how the raw materials—often press releases— can be structured to influence news content in a way that promotes effective message delivery to the public. Organizations such as the Centers for Disease Control or the American Cancer Society stand no chance of ever matching the promotion budgets of those promoting unhealthy personal habits. As such, pro-social groups are forced to meet

the same goals as profit-driven, business-sponsored campaigns by taking advantage of the news media's desire and self-proclaimed requirement to inform, but this means also dealing with the media's editing system. A well tailored press release or video news release could work within this editing process by offering content that fits messages appropriate to the EPPM and thus promotes socially positive outcomes.

For example, commercial spending to spread corporate messages about food reached $7 billion in 1997 (Gallo, 2005). At the other end of the spectrum, the United States Department of Agriculture spent only $333.3 million to deliver messages on nutrition. The agriculture department total equals just over half of what the soft drink industry alone paid to promote carbonated drinks and less than half of expenditures on beer, candy, or breakfast cereals. Using predictive models to guide message design can aid non-profits in being more efficient and effective with their limited dollars.

An illustrative example is the $1.03 billion dollars McDonald's alone spends yearly on advertising to persuade the public to spend its money at their restaurants (Finnegan, Viswanath, & Hertog, 1999). The company is quite successful in their attempts to influence the public, as each dollar spent on advertising results in $5 in sales. In contrast, the National Cancer Institute spent about $1 million annually on communications throughout the first 10 years of the 5-A-Day Program for better nutrition (National Cancer Institute, 2005). While a significant sum of money, it in no way matches the competition and at least partially illustrates the scale of the influence battle required to combat the problem of less healthful eating in the United States. Such is the environment in which pro-social groups are trying to persuade Americans to undertake better lifestyle habits.

Public relations campaigns targeted at reporters can garner millions of dollars worth of free media exposure to work on the spending gap. This is a tactic frequently seen as pro-social groups hold charity events or telethons and local media deem these happenings newsworthy. Newspapers and television stations devote significant space to reporting on educational community events.

However, solely establishing public relations campaigns and garnering media coverage is of little value if the message being received by the public is an ineffective one that fails to drive attitude or behavior change. The press releases and educational materials constructed for reporters must focus on essential elements of an effective message. In the context of the EPPM, this means each press release would need a perceived threat and a stronger perceived efficacy element. Based upon this dissertation research, P.R. writers would be wise to also add an outcome-relevant involvement element and consider other traits that may influence individual reactions to health education messages.

News stories concerning health topics would then be increasingly likely to be effective as positively influencing public health. Web sites for pro-social groups could follow the same guidelines, ensuring that their content is structured for maximum effectiveness. Potentially, these Web sites could also incorporate some of the findings from earlier in this dissertation relating to the significance of individual-level traits. More precise structure in press releases and other press materials in combination with similar messages on counterpart Web sites could help pro-social organizations gain an optimal level of benefits from their unpaid media exposure and counter some of the constant, paid media exposure used by corporations.

Additional persuasion variables in the Extended Parallel Process Model

The persuasion-variable additions to the EPPM also carry implications for the professional world. The findings of this study offer some suggestions for future message design, pending confirmation from other research. Knowing that individual-level variables such as need for cognition can influence reactions to educational messages suggests a different method of delivering health information. Digital media, in particular, present opportunities to tailor educational content on an individual level. Educational Web sites currently in use in medical contexts, for example, already pose demographic questions to learn about users' age, health status, and medical history before providing health information. These sites could also ask a few questions about personal traits such as need for cognition and adjust the educational content to more effectively target that individual. As digital media become omnipresent, this ability to tailor information will become both more available and more effective. These findings suggest another way to take advantage of digital media options certain to grow to be the standard in mediated communication.

Other variables that demonstrated direct relationships with behavioral intention also present lessons useful in message design. Outcome-relevant involvement's position as a predictor of behavioral intention indicates that it merits consideration when designing persuasive health messages. Further examination in fear appeal research will be necessary to confirm and refine the relationship between involvement and behavioral intention, but results from this study indicate that outcome-relevant involvement was a stronger predictor of behavioral intention than perceived threat. Should this relationship hold in

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other projects, it would indicate that persuasive message designers would be well served to consider promoting outcome-relevant involvement as a means of gaining message compliance. In addition, public relations practitioners responsible for educating media professionals could include involvement messages in their press materials, as opposed to current campaign messages that often focus exclusively on fear.

These findings are important because they may offer other avenues to gaining compliance for public health messages. Stressing the relevance of one's involvement in the outcome of a health topic also removes some of the ethical questions presented by high-threat messages. Relevance-centered messages may additionally help to reach segments of the population impervious or overexposed to fear appeals.

Design and measurement issues

This study's efforts to improve the methodology surrounding fear appeal research also carry practical implications. Understanding the effects of more rigorous methodology can aid other communicators in understanding how to more accurately employ tactics supported by fear appeal research. Better knowledge about the effectiveness and limits of fear appeal messages can aid health communicators in their message-design efforts by allowing them to more effectively predict outcomes and use limited resources to test messages. The more that health communicators understand about message design, the more effective campaigns will be and the more efficiently communicators can use available resources in designing and evaluating promotions. The results from these studies also help to more thoroughly grasp the impact of certain variables on dependent measures such as behavioral intention.

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Post-hoc findings

Other findings are also worth considering for future research and applications. Several post-hoc tests found non-predicted relationships that merit mentioning because of their potential use in health communication campaigns. Individual intentions to undertake the suggested health behaviors were predicted strongly by how much people believed in the provided news content and also by how frequently individuals made use of news sources. Those considering the news content to be believable reported being significantly more likely to adopt the recommended behavior. This finding serves to underscore the importance of developing long-term rapport with consumers that focuses on trusting relationships between the information providers and the audience. Although not as strongly, individual news consumption habits also predicted intention to modify personal behaviors, presenting the possibility that frequent news consumers may need to be targeted differently than infrequent consumers.

Sensation seeking and need for cognition were additional predictors of behavioral intention, both directly and as interaction terms with the message conditions. However, the direct relationships showed sensation seeking and need for cognition to be positive predictors of intention to follow suggested behaviors while the interaction terms produced results suggesting that they negatively moderated the relationships between message conditions and behavioral intention.

Like for behavioral intention, news consumption was a predictor of outcome-relevant involvement. Gender and age also predicted outcome involvement. While gender and age were not large predictors, their relationships were statistically significant. Perceived threat had non-hypothesized relationships with sensation seeking and with how strongly

individuals believed the content of the provided news articles. Believability was a notable positive predictor while sensation seeking was a small negative predictor.

None of these relationships were expected or predicted in this research's hypotheses. Other theories may posit explanations for these connections, or this data may serve to aid in the development of future theories.

Limitations and future research

This study has several limitations that are worth noting and considering in future research. One challenge with fear appeal research is that it is conducted in laboratory or experimental settings and assumes that the perception of threat or emotional fear is the predominant outcome of exposure to fear appeal messages. Naturalistic studies could better account for exposure, attention, interest and comprehension issues. Most fear appeal data stem from planned situations and are unable to assess outside influences.

Another issue is that fear appeals are not limited to producing only fear or threat as a reaction (Witte & Allen, 2000). Outcomes do not arrive with the precision that researchers may like or expect. Fear may be the strongest emotion stemming from a health message; researchers, though, should recognize that surprise, puzzlement, anger, and sadness can also come about as a result of a fear appeal (Dillard, Plotnick, Godbold, Freimuth, & Edgar, 1996). Other projects have reported outcomes such as: irritation (J. Kirscht & Haefner, 1973); disgust (Leventhal & Trembly, 1968); tension and energy (LaTour & Pitts, 1989); and emotional issues such as anxiety and depression (Kohn et al., 1982).

The variety of reactions is essential to consider when developing campaigns. Individual interpretations of fear appeals do not take place neatly despite scientists'

efforts and wishes. It is essential to understand that other reactions are not only possible but should be expected. Counting on this variance can help campaign designers and researchers more accurately grasp why certain messages show particular effectiveness or not. It is entirely plausible that a consistently found reaction other than fear may prove to be the most effective route to compliance-gaining for health education messages. Such a relationship would, of course, then require theoretical consideration as an addition to an existing model or in some future development.

Also considering effectiveness, another limitation is that real-life messages would place more focus upon the efficacy components in each message. Since this study was interested only in the processing of messages and not the actual structure or effectiveness of message components, the content used here possibly did not perfectly mirror what a real campaign would produce. Future studies could use actual messages or articles to test reactions to real content, as opposed to content developed according to newswriting conventions.

Regardless of the message manipulations, researchers are additionally limited by the shallow understanding of what makes for an effective fear appeal message. Any review of the fear appeal literature demonstrates that it is not apparent what makes for an effective arousing message (Boster & Mongeau, 1984), although response manipulations seem to have increased in effectiveness since the initial research (based upon the correlation between the year of study and the manipulation check, r = .13) (Witte & Allen, 2000). Messages that researchers think are highly arousing may not actually be fear- or threat-inducing for the participants, but more careful message definitions and construction have begun bridging this gap (Witte & Allen, 2000).

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The design of using different messages to gain variance within the measurement instruments also brings some limitations. While each condition was compared to the others according to certain dimensions, there may have been other, inadvertent effects of each treatment condition that could influence outcomes. It is possible that particular topics, recommendations, accompanying information, or even article structure influenced individuals' reactions to the messages in unpredicted ways. Despite any researcher's best efforts, it is impossible to ensure completely that multiple treatment conditions within any experiment are equal.

As discussed in the literature review of this dissertation, any number of moderating variables may influence the relationship between the message conditions and perceived threat. Each of the meta-analyses on fear appeal research contends that moderators may exist within this relationship. While this study attempted to test two moderating variables, others almost certainly exist. These other moderating variables could well have influenced outcomes in ways unobserved by data collection for this project. Only further research projects will be able to determine what these moderators may be.

The way moderators were measured in this project may also present less than ideal data outcomes for interpretation. Some methodologists suggest that the dependent variable in a moderation analysis needs to be measured by a number of response options equal to or greater than the product of the number of options used to measure the independent variable and the moderating variable (Frazier, Tix, & Barron, 2004). For example, if the I.V. and moderator are each measured on five-point scales, the D.V. should be measured on a 25-point scale. Using a composite dependent variable made up of multiple five-point items does not resolve the issue. For ease of measurement, Frazier

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et al. suggest having respondents rate their reactions by marking a continuous line as an alternative.

Even without the moderators, the EPPM-predicted relationship between an arousing message and outcomes is not entirely unambiguous, either. The data regarding the relationship between a reaction and desired outcomes (behavior or attitude change, for example) are sometimes unclear (Roskos-Ewoldsen, Yu, & Rhodes, 2004). In the context of EPPM, this mixed data means that a threat message does not necessarily lead to a danger control reaction (meaning a self-protective adaptation) when paired with a strong efficacy component. Two meta-analyses from 2000 provide examples of this uncertain data about the link between fear appeals and self-protective behavior. Witte and Allen (2000) indicated that high levels of threat in a message may possibly lead to fear control's negative reactions regardless of efficacy levels in the message. Floyd et al. interpreted (2000) the data to mean that response and self-efficacy were the strongest predictors of danger control processes regardless of levels of fear. These alternative perspectives merit consideration when interpreting data.

Other limitations come from the sample population used in this research. Online respondents do not perfectly mirror the wider world. They are more likely to be educated, wealthy, white, and suburban. No survey sample is likely to perfectly reflect the general population unless it is actively chosen to do so, but research using online respondents has made certain demographic trends clear. Researchers would be wise to consider these demographics when interpreting results.

In addition to the sample attributes listed above, respondents in this study may differ from the general population in other ways. The survey instrument used here did not

measure respondents' access to quality health information or care, two things that could influence reactions to health messages. It is reasonable to conclude that those with a history of receiving quality medical care and information would be more likely to feel empowered and capable of handling health issues. These individuals are more likely to have a track record of positive outcomes. People excluded from positive healthcare experiences, however, could be expected to view health information and expectations through a more fatalistic, negative lens.

Literacy levels were also not measured in any way. The study did consider respondents' ability to answer fact-based questions, and this is often taken as a proxy for an individual's ability to read and comprehend. However, the relationship between reading and question-answering is not perfect. Individuals with reduced literacy skills can be quite adept at matching phrases or grasping just enough information to answer multiple-choice questions. These individuals would most likely not be able to provide valid responses to questions about reactions to the reading material, however. Their inability to comprehend a majority of the text would prevent them from offering considered reactions to the messages and subtleties of the text.

Future research could improve on similar projects by addressing not only the issues above but a number of other areas as well. Methodology could be expanded to better examine potential message reactions, social factors in communication, media's propensity to promote illness, cultural values, and individual readiness for behavior change could all be considered, for example.

As Witte and Allen (2000) suggest, more carefully defining message elements and responses could improve research in this area. Fear control responses such as defensive

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avoidance, denial, and reactance have been particularly neglected in fear appeal research. Additional measurement methods such as thought-listing tasks could be employed to measure the range of respondent reactions since thought-listing allows for the examination of message-processing issues and for alternative validation of response measures.

The social context surrounding the presented health issues may also prove to be a factor worth examining in future research. Apart from age, trait anxiety, and volunteer status, it is entirely plausible other human elements that create social context also influence individual understanding of risk-related issues (Branden Johnson, 1987). For example, beliefs about the source, other people and the subject matter at hand can influence both how and which messages are accepted.

Membership in social networks can play a role in perceived message credibility and an individual's level of concern (Branden Johnson, 1987). Research into the community surrounding the toxic-waste site known as the Love Canal demonstrates this well. Well-connected citizens of the Niagara Falls neighborhood expressed the most concern about the pollution risks and also were the first to stop trusting official sources (Fowlkes & Miller, 1987). Unconcerned residents, however, reported being relatively isolated from their neighbors. This same link between social interactions and concern about place has shown itself in other contexts as well, particularly natural disasters (Kiecolt & Nigg, 1982; Moore, Bates, Layman, & Parenton, 1963; Perry, 1982).

Any health-risk message presented in a mediated context inherently brings associated thoughts as well. In the context of health, journalists play a particular role in public perceptions. Direct-to-consumer advertising, drug-company-organized awareness

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campaigns, and disease advocacy groups are obvious factors in "disease mongering" (Moynihan & Cassels, 2005). However, journalists can also play a role by not thoroughly examining evidence used in medical stories (Woloshin & Schwatrz, 2006). News providers, after all, remain a major source of health information and thus have the power to promote diseases (Kaiser Family Foundation, 2005). An illustrative example worth noting is the promotion of restless legs syndrome (RLS) in 2003 through uncritical journalism outlets, as outlined by Moynihan and Cassels (2005).

Culture is another variable worth considering, as cultural characteristics can interact with health-related decisions and behaviors (Kreuter & McClure, 2004). This can happen directly through dietary habits or indirectly through tight family connections that create an insistence on caring for others at the risk of one's own health. Due to such factors, health researchers recognize that cultural characteristics need to be an influence on public health strategies to enhance adoption, salience and acceptance of programs and messages (Institute of Medicine, 2002; Perez-Stable, Otero-Sabogal, Sabogal, & Napoles-Springer, 1996).

Lastly, an individual's readiness to accept behavior-modification suggestions could be worth noting in upcoming projects. Behavior change, of course, does not occur exclusively as a result of a reaction to a one-time message. No shortage of research has demonstrated that real behavior modification takes place over time as individuals move through behavioral and psychosocial stages with differing needs and characteristics (Prochaska, Redding, & Evers, 2002). Therefore, presence in a particular stage of behavior change could influence an individual's reaction to a fear appeal (Cho & Salmon, 2006). Potentially, as Maibach and Cotton describe (1995), fear appeals could aid in

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motivating individuals to work through stages of change by strengthening their plans to engage in preventative behavior. Of course, some fear appeal researchers also raise the concern that inappropriate fear appeals may have the opposite effect and result in hardened negative attitudes (Maibach & Cotton, 1995), despite evidence to the contrary (Sutton, 1992). Little research, however, has studied effects of fear appeals according to the stages of change (Cho & Salmon, 2006).

Stages of change as developed by Prochaska and DiClemente (1983) is a framework created to lay out the process used by individuals as they commence and maintain preventative behavior. More properly known as the transtheoretical model, this framework attempts to establish a "structure of change that underlies both self-mediated and treatment facilitated modification of addictive and other problem behaviors" (Prochaska, DiClemente, & Norcross, 1992, p. 1102).

The overall model consists of several constructs, but it is the stages of change that have become the most frequently used component (Reed, Velicer, Prochaska, Rossi, & Marcus, 1997). The other, more mechanistic components making up intermediate and outcome components include self-efficacy, temptation, decisional balance, and processes of change. The stages of change, however, are the central organizing structure of the overall model (Prochaska & Velicer, 1997).

Five specific stages of change are covered in the transtheoretical model: pre-contemplation, contemplation, preparation, action, and maintenance (Prochaska & DiClemente, 1982). The pre-contemplation stage is defined as the time period during which an individual lacks any intention to take action within six months. Contemplation is when the intent of the individual changes, and that person plans to take action within

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the next six months. Preparation is the next step, meaning the individual intends to take action within 30 days and has taken some behavioral steps toward the action. Action includes actually having changed behaviors but only for a reduced period of time, usually less than six months. Once an individual has altered a behavioral pattern for more than six months, that person has entered the maintenance stage. Lastly, when a behavior becomes automatic and no chance of slipping backward exists, the goal of the termination stage is reached. Termination also requires an extended period of behavior maintenance (five years is often cited) and dominant self-efficacy to continue the desired behavior (Prochaska & Velicer, 1997).

Typically, moving from pre-contemplation to maintenance (or termination) is not a direct, linear progression. Instead, the route has been described as a spiral pathway involving backward slips (Prochaska, Norcross, & DiClemente, 1994). However, one consistent finding of TM studies has been a link between level of perceived self-efficacy and movement between the pre-contemplation and maintenance stages (Gorely & Gordon, 1995; Rapley & Coulson, 2005; Wakui et al., 2002). Response efficacy can similarly be linked to progress through the stages for several reasons (Cho & Salmon, 2006). First, the TM construct of decisional balance is linked to response efficacy in that a response must appear to be effective in order to be perceived as beneficial. Being perceived as effective is requisite for response efficacy and being perceived as beneficial is necessary for shifting to the positive side of decisional balance.

As Cho and Salmon (2006) point out, Prochaska et al.'s (1994) study of 12 risky behaviors noted that individuals moving from the pre-contemplation to the contemplation stage reported the advantages of preventative behavior were also beginning to prevail

over disadvantages. Thus, it is reasonable to conclude that efficacy was also increasing as the individuals were moving through the stages since being perceived as effective is necessary for being perceived as beneficial (Cho & Salmon, 2006).

Summary of implications

Effective dissemination of health information is a necessary task for health communicators and media professionals. Disseminating health information also means providing content useful for behavior change and promoting positive health behaviors among the population. Developing such messages, however, is no simple task nor is understanding how individuals mentally process such messages.

This dissertation provides three areas of progress in research into understanding how people evaluate and respond to fear appeal messages. First, the research places an extensively used message-processing model in a different and important mass communication context. Second, it shows how additional psychological qualities such as an engagement with health outcomes and a desire to think rationally can influence individual reactions to persuasive messages. Third, this research shows that more attention to instrument design, construct measurement, and experimental treatments can provide more significant statistical results.

The incorporation of new variables into an existing model applied in an atypical context is central to the type of research needed to develop more effective health communication messages. In addition, more attention to the social scientific methods used to examine fear appeal reactions is essential to gaining a more precise understanding of how to employ persuasion techniques. Together, testing theories in diverse contexts and using more rigorous scientific techniques will lead to more useful applications of

health communication strategies as well as more robust predictive models.

APPENDICES

APPENDIX A:

Treatment Articles

Most Americans Exposed to HPV at Some Point, Experts Say
AP Associated Press

Chances are you have been exposed to the potentially cancer-causing human Papillomavirus virus and don't even know it. In fact, at least three out of four sexually active adults under 50 have been infected with a strain of HPV, according to data released by public health officials this week.

In the United States alone, up to 6.2 million new cases occur each year, and at least 20 million Americans are now infected with the genital strain of the most commonly acquired STD, according to public health officials.

Almost all infections cause no symptoms or health problems, but nearly all cases of cervical cancer stem from HPV. Some vulvar, anal, and penile cancers come from HPV, too. Public health officials guess that cervical cancers kill about one-third of those stricken each year.

There are about 200 types of HPV. About 40 strains are spread through sexual contact, and a handful of those are the ones linked with cervical cancer. However, because the disease is so common and can have such a deadly outcome, public health experts rank HPV to be among the most serious health issues facing young men and women in their teens and twenties.

HPV can only be prevented by not having sex. Public health experts strongly suggest becoming more informed as a key first step. A Web site such as the Center for Disease Control's at www.cdc.gov/std/hpv/ can be useful before talking to a doctor. Having sex with only one partner is also an effective way to decrease your risk. In the future, a new vaccine may offer some protection from HPV-related cancers. Always using a condom can help to reduce risk, too.

Public More Informed About Clinical Trials, Experts Say

AP Associated Press

Awareness of clinical trials has grown over the last three years as more people have seen news coverage and had the chance to participate in research studies, according to data released by public health officials this week.

Almost 20 percent of Americans report being offered the chance to take part in a clinical trial, an increase of seven percent from three years ago. Among the 5,822 people surveyed, more than half of those given the option agreed to take part.

Clinical trials are research projects carried out on human volunteers to learn more about the body and the diseases that attack it. They test how well new medical approaches work in people. Each of the 36,000 active studies in the U.S. is trying to find a better way to prevent, diagnose, or treat a disease.

Participants in clinical trials benefit in a number of ways. They take a more active role in their healthcare and may get to try new treatments. In addition, they often get free care at some of the best hospitals around the country. There are risks to being in a clinical trial, too. Doctors are not always aware of the side effects of the new treatments. These new methods also may not work or may take longer than normal care.

Public health experts strongly suggest becoming more informed as a key first step to participating in a clinical trial. A Web site such as the National Institute of Medicine's clinicaltrials.gov can be useful when gathering information or preparing to talk to a doctor. Interested people can also enroll by talking to the clinical trial's coordinator.

A Quarter of Americans Exposed to Food Poisoning Each Year, Experts Say

AP Associated Press

More than a quarter of all Americans come down with food poisoning each year, suffering symptoms such as nausea, vomiting and diarrhea, according to data released by public health officials this week.

There are about 76 million cases in the United States each year, but most of these cases are preventable. People with food poisoning typically get sick within 48 hours of consuming infected food or drink.

Many cases are mild and pass so quickly that they are never diagnosed. One victim out of every thousand does end up in the hospital, however. One of the most common bugs—salmonellae—costs up to $1 billion in medical expenses and lost work time each year.

More than half of food poisoning cases are caused by improper cooking and storage of foods. About a quarter of them stem from poor hygiene, such as not washing hands before handling food. Only a small number of cases are the result of an unsafe food source. The growing rates of food poisoning, as well as its personal and financial cost, have convinced public health officials food poisoning is a real public health risk.

Food poisoning can be prevented with some simple steps, such as: washing hands, cleaning utensils, cooking food all the way through and storing raw and cooked food in separate containers. Public health experts also strongly suggest becoming more informed as a key first step. A Web site such as the Center for Disease Control's www.cdc.gov/foodborne/index.htm can be useful in learning tips to keep healthy.

Prostate Cancer Biggest Health Threat to Men, Experts Say

AP **Associated Press**

Once dismissed as an "old man's disease," prostate cancer is now recognized as the biggest health threat to men of all ages. It kills tens of thousands of men each year and causes erectile dysfunction in hundreds of thousands more. This cancer strikes in the prime of life—and the threat may be growing, according to data released by public health officials this week.

The rate of prostate cancer has increased by more than 50 percent in the last 30 years while rates of other types of cancer have dropped. Public health officials expect that the number of new prostate cancer cases detected each year will likely double again by 2015.

The disease is now the top cancer killer of men. About a quarter of all American men who develop prostate cancer die of it, making the disease the male equivalent of breast cancer. However, prostate cancer can be far more dangerous because it usually does not produce signs or symptoms in its early stages, when treatment is most successful. Another real problem is that the treatments bring high risks of fearsome side effects such as impotence, according to public health officials.

Prostate cancer cannot be prevented, but there are ways to reduce the risk or slow the disease's progress. Public health experts strongly suggest becoming more informed as a key first step. A Web site such as the Center for Disease Control's www.cdc.gov/cancer/prostate/ can be useful before talking to a doctor.

Also, eating a healthful, low-fat diet rich in fruits and vegetables may help fight cancer. Exercise and certain drugs may help control prostate growth. Exercise can reduce other risk factors such as obesity and poor blood flow, too.

Breast Cancer Biggest Health Threat to Women, Experts Say

AP Associated Press

Breast cancer remains a top killer of women in the United States despite vast efforts to combat the disease, according to new data released this week by public health officials. The last 30 years have actually seen this most common form of cancer become more widespread.

More than 212,000 American women will develop breast cancer this year alone, according to public health officials. About 40,000 women will die, and thousands more will undergo radiation therapy or mastectomies.

All women are at risk for breast cancer, regardless of age or family history, the officials say. Up to 90 percent of women who develop breast cancer do not have a family history of the illness. Some factors, though, could affect a woman's risk. These include: being overweight, taking birth control pills, inactivity, or using hormone therapy over several years.

Breast cancer cannot be prevented, but some actions may reduce the risk. Public health experts strongly suggest becoming more informed as a key first step. A Web site such as the Center for Disease Control's www.cdc.gov/cancer/breast/ can be useful before talking to a doctor.

Eating a healthful diet rich in fruits and vegetables may also help fight cancer. Other tips suggested by health officials include getting regular exercise and taking supplements such as folate. Self-exams and check-ups are essential as well because they help women detect problems at an early stage when treatments are most useful.

APPENDIX B:

Pilot Study

After developing the treatment articles and establishing indices to measure the relevant variables, an online community was used to pilot test the articles and the survey instruments. Researchers placed a link to the survey on the community's homepage during the last week of March 2007 and gave members three days to respond. The incentive offered was entry into a random drawing for one $100 prize.

Participants were randomly assigned to one of the five message conditions and were exposed to only one article. The order of survey questions was consistent for each individual. The only change was the treatment article and necessary wording changes in the accompanying surveys. Participants were free to take the survey at any time and at any computer location convenient to them, such as work, home, library, or school. The survey items and instructions are shown in Appendix C. Each survey for the five treatment articles was equivalent except for changing the article's health topic where appropriate. Individuals were free to quit the survey at any time and were made aware of this in their informed consent form. During the data collection period, 134 people completed the pilot study in full, and 47 also offered qualitative comments that were used in many cases to improve survey design and wording.

The pilot survey presented instructions, questions, and the treatments in the following order:

- Introduction to survey and consent form.
- Demographic information, including: age, gender, marital status, ethnicity, nationality, familiarity with relevant health topics, relationship status, news-reading habits.
- Sensation seeking instrument: 8 questions with 5-point scales.

- Need for cognition index: two options—one of 18 questions with 7-point scales and one of 3 items with 7-point scales.

- Outcome-relevant involvement: two options—one of 3 questions with 7-point scales and one of 8 questions with 7-point scales.

- Introduction to the newspaper article asking respondents to read the content and answer further questions.

- Treatment article concerning clinical trials, food poisoning, human Papillomavirus, prostate cancer, or breast cancer.

- Comprehension questions: 4 questions with true/false format.

- Believability index: 4 questions with 7-point scales.

- Perceived severity instrument (one-half of perceived threat): 3 questions with 7-point scales.

- Perceived susceptibility (one-half of perceived threat): 3 questions with 7-point scales.

- Response efficacy (one-half of perceived efficacy): 3 questions with 7-point scales.

- Self-efficacy (one-half of perceived efficacy): 3 questions with 7-point scales

- Behavioral intention: 6 items with 7-point scales.

- Thank-you note, further information on the treatment article's topic.

- Open section for respondent comments.

Pilot study results

As previously stated, the treatment articles were intended to produce differing levels of perceived threat, with the clinical trials article acting as a baseline control condition.

The inclusion of the clinical trial piece served to have respondents read some news content before responding to the survey items but not be exposed to threatening messages. A between-groups, one-way ANOVA revealed that perceived threat scales did differ significantly as a function of exposure to a particular article $(F(4,129) = 55.92, p < .001)$. The Levene statistic $(.882, p = .476)$ indicated that the groups did not have significantly different variances, meeting one of ANOVA's key assumptions. In addition, examination of the Q-Q plot and the relationships between the standard errors and skewness and kurtosis indicate that the data are sufficiently normal to accept F-test results.[9] Table 20 contains the pilot test descriptive statistics, including means and standard deviations.

Table 20. Pilot Test Descriptive Statistics for Perceived Threat by Article Subject

Topic	N	Mean	Std. Dev.	Std. Error
Breast	16	5.97	1.14	.28
Prost.	26	5.42	1.01	.20
HPV	35	4.14	.98	.17
Food	26	4.06	.81	.16
Trials	31	2.24	.93	.17
Total	134	4.15	1.57	.14

A post-hoc Tukey honest significant difference test on the pre-test data did reveal that the clinical trials article induced significantly less threat than the other write-ups. As expected, the cancer articles were not significantly different from each other, and neither were the virus-focused human Papillomavirus and food poisoning articles. The various treatments were successful in that the messages created multiple levels of perceived

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[9] One rule for checking for normality is to divide the skewness and kurtosis results by their standard errors. Results between -1.96 and 1.96 indicate that the data are not significantly different than normal.

threat, breaking down into three distinct categories: a control condition, a virus-related condition, and a cancer-related condition. Table 21 contains the results of the Tukey's HSD analysis.

Table 21. Perceived Threat by Article Topic

Article Topic	Other Topics	Mean Diff.	Std. Error	Sig.
HPV	Clinical Trials	1.90(*)	.24	.000
	Food Poison.	.08	.25	.998
	Prostate Canc.	-1.27(*)	.25	.000
	Breast Canc.	-1.83(*)	.29	.000
Clinical Trials	HPV	-1.90(*)	.24	.000
	Food Poison.	-1.82(*)	.26	.000
	Prostate Canc.	-3.17(*)	.26	.000
	Breast Canc.	-3.73(*)	.30	.000
Food Poison.	HPV	-.08	.25	.998
	Clinical Trials	1.82(*)	.26	.000
	Prostate Canc.	-1.35(*)	.27	.000
	Breast Canc.	-1.90(*)	.31	.000
Prostate Canc.	HPV	1.27(*)	.25	.000
	Clinical Trials	3.17(*)	.26	.000
	Food Poison.	1.35(*)	.27	.000
	Breast Canc.	-.55	.31	.376
Breast Canc.	HPV	1.83(*)	.29	.000
	Clinical Trials	3.73(*)	.30	.000
	Food Poison.	1.90(*)	.31	.000
	Prostate Canc.	.55	.31	.376

* The mean difference is significant at the .05 level.

As this is not a message-design study, the exact outcome from different message components is not as important as the creation of different levels of perceived threat. Again, the objective for employing multiple message conditions was to ensure variance among responses to the measurement indices for the variables included in the research model.

Along with perceived threat, believability and subject knowledge were also key considerations for ensuring that the five articles fulfilled their functions. Believability

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was a necessary check because the influence of the articles depended at least in part on their perceived truthfulness. The respondents' comprehension levels were important to verify that the individuals actually read the articles and maintained some familiarity with the content.

Believability was measured using four items across seven-point Likert-type response scales. Respondents in all five groups reported high scores on the believability instrument (averaging a 5.44 out of 7), and no significant differences were found among the conditions. A one-way ANOVA to check for differences returned a non-significant result ($F(4,129) = 1.48$, $p = .213$), and Tukey's HSD post-hoc analysis found no significant differences, either. Checks for violation of necessary ANOVA assumptions turned up no conflicts. Table 22 presents the believability index descriptive statistics for each article treatment group.

Table 22. Group Descriptive Statistics for Believability Index Scores

Topic	N	Mean	Std. Dev.	Std. Err.
HPV	35	5.35	1.05	.18
Clin. Trials	31	5.28	.62	.11
Food Pois.	26	5.79	.68	.13
Prostate Canc.	26	5.35	.95	.19
Breast Canc.	16	5.50	1.06	.27
Total	134	5.44	.89	.08

In addition, there were no significant differences among the individual items in the believability scale. Tables 23 and 24 display the descriptive statistics for the believability items and Tukey's HSD results.

Table 23. Item Descriptive Statistics for Believability Index

Items	N	Mean	Std. Dev.
To me, the advice given in the article is believable.	134	5.66	1.05
In my opinion, the information given in the article seems useful.	134	5.38	1.14
The advice given in the article is accurate.	134	5.19	1.04
The information I read in the article looks true to me.	134	5.53	.99
Mean Scores	134	5.44	1.06

All items used a seven-point scale.

Table 24. Tukey's HSD for Believability Items

Article Cond.	Article Cond.	Mean Diff.	Std. Err.	Sig.	95% C.I.	
HPV	Clin. Trials	.07	.22	.998	-.54	.67
	Food Pois.	-.45	.23	.294	-1.08	.19
	Prostate Canc.	-.01	.23	1.00	-.64	.63
	Breast Canc.	-.15	.27	.980	-.89	.59
Clin. Trials	HPV	-.07	.22	.998	-.67	.54
	Food Pois.	-.52	.24	.190	-1.17	.14
	Prostate Canc.	-.07	.24	.998	-.73	.58
	Breast Canc.	-.22	.27	.931	-.97	.54
Food Pois.	HPV	.45	.23	.294	-.19	1.08
	Clin. Trials	.52	.24	.190	-.14	1.16
	Prostate Canc.	.44	.25	.377	-.24	1.12
	Breast Canc.	.30	.28	.827	-.48	1.08
Prostate Canc.	HPV	.01	.23	1.00	-.63	.64
	Clin. Trials	.07	.24	.998	-.58	.73
	Food Pois.	-.44	.25	.377	-1.12	.24
	Breast Canc.	-.14	.28	.986	-.92	.63
Breast Canc.	HPV	.15	.27	.980	-.59	.89
	Clin. Trials	.22	.27	.931	-.54	.97
	Food Pois.	-.30	.28	.827	-1.08	.48
	Prostate Canc.	.14	.28	.986	-.63	.92

According to the comprehension check scores, respondents read and accurately interpreted the information contained in the articles. Comprehension was measured using four true-false items adapted from the previously read article. While this does mean that

each of the five groups responded to different comprehension check items, the four

questions for each group were made as similar as possible to provide for some

consistency across the sample. All of the comprehension instruments focused on the basic

information common to all five articles: frequency of the issue, preventative measures,

risk factors, and severity information. All items in this index were answered correctly at

least 90 percent of the time, and respondents in each group received average overall

scores ranging from 88 percent to 94 percent. Based upon these results, it appears that

respondents understood and processed the information presented in the various articles.

Table 25 contains the percentage correct scores for each item of the various

comprehension check instruments.

Table 25. Comprehension Check Percentage Correct Scores By Treatment Condition

Topic	Item 1	Item 2	Item 3	Item 4	Mean
HPV	.87	.94	.83	.88	.88
Clin. Trials	.90	.95	.97	.95	.94
Food Pois.	.95	.93	.90	.95	.93
Prost. Canc.	.91	.94	.83	.92	.90
Breast Canc.	.96	.97	.96	.81	.93
Mean	.92	.95	.90	.90	.92

Instrument reliabilities

Another essential function of the pilot data collection was to test the reliability of

previously used, valid instruments and select among several options for a few variables.

The calculation of Cronbach's alpha served as means to ensure that the items were

sufficiently reliable when internal consistencies were measured. The Cronbach's alpha

for each scale was expected to be higher than .70 (Nunnally, 1978). All of the tested

instruments met this criterion. In addition, this researcher examined correlations among

the various survey items to ensure that none would pose multicollinearity problems.

Table 26 presents the complete correlation matrix. No items were inappropriately linked.

Table 27 shows the descriptive statistics and Cronbach's alpha coefficients of the scales.

Table 26. Bivariate Variable Correlations in Pilot Test Data

	DV	SS	BNFC	NFC	PLORI	ORI	BC	Threat	Effic.
DV	1.00	0.04	-0.12	.19(*)	.32(**)	-.22(*)	.21(*)	.45(**)	.47(**)
SS	0.04	1.00	0.08	-0.02	0.15	0.05	-0.14	0.11	-0.02
BNFC	-0.12	0.08	1.00	-.77(**)	-0.12	.26(**)	-0.14	-0.02	-0.09
NFC	.19(*)	-0.02	-.77(**)	1.00	0.15	-.33(**)	0.09	0.04	0.07
PLORI	.32(**)	0.15	-0.12	0.15	1.00	-.74(**)	-0.01	.33(**)	0.01
ORI	-.22(*)	0.05	.26(**)	-.33(**)	-.74(**)	1.00	0.10	-.21(*)	-0.01
BC	.21(*)	-0.14	-0.14	0.09	-0.01	0.10	1.00	0.14	.41(**)
Threat	.45(**)	0.11	-0.02	0.04	.33(**)	-.21(*)	0.14	1.00	.32(**)
Effic.	.47(**)	-0.02	-0.09	0.07	0.01	-0.01	.41(**)	.32(**)	1.00

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

DV: behavioral intention; SS: sensation seeking; BNFC: brief need for cognition; NFC: need for cognition; PLORI: Park and Levine outcome-relevant involvement; ORI: outcome-relevant involvement; BC: believability check; Threat: perceived threat; Effic.: perceived efficacy

Table 27. Descriptive Statistics and Cronbach Alphas for Pilot Test Measurement Instruments

Construct	# of Items	Cases	Mean	S.D.	Alpha	Typical Alpha
Perceived Severity	3	134	13	5.38	.92	.80
Perceived Susceptibility	3	133	11.95	5.36	.88	.80
Perceived Self-Efficacy	3	132	15.31	3.77	.77	.79
Perc. Response Efficacy	3	132	15.97	3.55	.79	.79
Cho/Boster Outcome-Rel. Involvement	7	132	38.02	10.17	.89	.87
Park et al. Outcome-Rel. Involvement	3	133	10.53	4.79	.91	.86
Sensation Seeking*	8	132	24.70	5.77	.77	.76
Brief NFC Index	3	134	7.33	3.36	.78	.69
Short NFC Index	18	130	89.70	14.38	.87	.76
Believability Check	4	134	21.76	3.57	.87	N/A
Behavioral Intention	6	133	23.49	8.39	.82	.81

*All instruments use 7-point Likert-type scales, except for Sensation Seeking. The 8-item instrument used for Sensation Seeking employs 5-point Likert-type scales.

Each instrument produced acceptable Cronbach's alpha coefficients, and in most cases scored higher than in prior uses. For the variables outcome-relevant involvement and need for cognition, two scales were tested with the goal of selecting one most effective option for the final data collection. In the case of outcome-relevant involvement, Park et al.'s version produced a slightly higher alpha coefficient. Combined with its shorter format (three questions versus seven), the decision was made to include this version in the final instrument. Park et al.'s outcome-relevant involvement scale thus

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serves two positive purposes in that it can produce a favorable alpha coefficient and it requires only three items in the survey.

The need for cognition indices did not work out as neatly. The alpha coefficients did clearly show the short NFC scale to be more reliable than the brief edition (.87 to .78), but the short scale is 15 items longer than the brief version. Considering the difference in Cronbach's alpha, however, the 18-item short NFC scale was selected as the more prudent choice for final data collection.

In addition to helping decide among survey instrument options, pilot testing also helped improve the wording of several questions. Respondents' qualitative comments proved helpful in improving the clarity of some survey items and suggesting alternative wording.

APPENDIX C:

Pilot Test Survey

Please note that the format used for online testing has been approximated here as best as possible. Certain formatting norms of online publication, such as thinner columns, do not translate well to the printed page. In addition, certain functional survey items such as answer-selection buttons do not reproduce in word-processing documents. Pages of the survey are indicated in parentheses before the start of each page. In the online version, page progress was indicated by text at the bottom of each page that let respondents know both their progress and the pages remaining by saying, for example, "Page 6 of 11."

(Page 1 of the pilot test)

News Reaction

Welcome, and thank you for taking the time to participate in our study, which should last less than 25 minutes!

INTRODUCTION

You are being invited to participate in a research study about how people view mass media coverage of health topics. Researchers at Michigan State University will perform the study. Participants will need about 25 minutes to complete the survey. In return for completing the survey, respondents will be entered into drawing to win a $100 prize. The prize will be distributed in approximately one week after data collection is complete.

PURPOSE

The purpose of this study is to determine how people understand and view coverage of health-related topics in the mainstream media.

WHAT IS INCLUDED IN THIS PROJECT?

Participants will be asked to read an online news story and complete survey questions regarding the story and their reactions to it. Participants will also answer survey questions about their personal views on the world around them. Completing the reading and questions is estimated to take 25 minutes.

PROCEDURE

If you decide to take part in this study, you will be asked to consent to the items discussed below. All of the information collected for this project will be kept confidential to the maximum extent allowed by the law. You may be asked to complete a series of surveys about your reactions to the news media and your views on your environment.

PARTICIPATION

Participation in this study is entirely voluntary. In addition, should you choose to participate in the overall study, you may still decline to participate in any segment of the survey. You may also choose to discontinue your participation at any time. Any refusal to participate or decision to discontinue will not affect any future opportunities to participate in surveys offered through this online panel.

RISKS

Although it is highly unlikely, there is a chance that you might feel uncomfortable with some of the questions during the course of the survey because they deal with health topics. If at any time during the course of the survey, you wish to refrain from answering a question or simply wish to stop participating, the survey can be postponed and/or terminated.

Participation in this study presents no physical threat.

BENEFITS

We cannot and do not guarantee you will directly benefit if you take part in this study. Through your answers, we hope to gain valuable information about the use of news media and more specifically coverage of health-related issues. It is our hope that the information we receive from you will help improve the quality of media coverage of health topics.

PAYMENT TO SUBJECTS

As a participant in this research study, you will be entered into a random drawing to win a prize of $100. Every respondent will have an equal opportunity to win the $100 prize. As such, we cannot guarantee payment to any individual, but everyone completing the survey will be equally likely to receive $100 for their time.

COSTS

Participation in this project will not cost anything. There will be no financial responsibility for any respondent nor any penalty for not participating.

ALTERNATIVES

The alternative to participating in this research study is to decline. Participation is purely voluntarily and for research purposes only.

CONFIDENTIALITY

Investigators will keep secret all research related to records and information gathered by this study. Throughout the study, all information from surveys will be stored in a manner to assure confidentiality of the subjects

to the maximum extent allowable under law. Your privacy will be protected to the maximum extent allowable by law. The investigators will not reveal your identity if they publish the results of the study.

QUESTIONS

Through this form, the investigators have tried to answer questions to your satisfaction. If you have any particular questions about this study, please contact Brad Love by phone: (517) 432-6186, e-mail: lovebrad@msu.edu, or regular mail: 305 Communication Arts & Sciences, East Lansing MI 48824. If you have any questions or concerns regarding your rights as a study participant, or are dissatisfied at any time with any aspect of this study, you may contact - anonymously, if you wish - Peter Vasilenko, Ph.D., Director of the Human Subject Protection Programs at Michigan State University, by phone: (517) 355-2180, fax: (517) 432-4503, email: irb@msu.edu, or regular mail: 202 Olds Hall, East Lansing, MI 48824.

CONSENT

The investigator(s) gave you information about what will be done in this research study. You also were told how it will be done, what you will have to do, and how long the research will take. The information in this form attempted to tell you about any inconvenience, discomfort, or risks you might experience due to this research.

By clicking below, you agree to take part in this study as a research subject. You are aware that you may quit or refuse to participate in certain parts of the research at any time.

Accept   Decline

(Page 2 of the pilot test: note that each answer had a radio button placed before it. Here, the buttons are represented by empty circles. A few other items used a dropdown menu or text box, as indicated)

We would like to start by asking you some general questions.
The following items are all intended to help us learn a little about your background.
Please select the appropriate button for your gender.
 1. Gender
O Male
O Female

2. What is your age (optional, please enter "99" if you prefer to not answer)?
(dropdown menu)

3. What is your ethnicity (optional)?
O Asian / Pacific Islander
O African American
O Hispanic / Latino
O Caucasian
O Native American
O Other: (blank text box)
O Prefer not to respond

4. What is your country of residence?
O U.S.A.
O Canada
O Mexico
O Other: (blank text box)

5. Are you currently a student?
O No
O Yes (High School)
O Yes (College/University)

6. If you are a student, what year are you?
O Freshman
O Sophomore
O Junior
O Senior
O Graduate/Professional
O Other: (blank text box)
O Not a student

7. What is your current relationship status (optional)?
O Single
O Committed Relationship
O Engaged
O Married

8. Where do you get news information? Please mark the items that best fit your situation.
O Newspapers (Hard Copy)
O Newspapers (Online)
O News Magazines (Hard Copy)
O News Magazines (Online)
O Blogs
O T.V.
O Radio

For the following sources, indicate how many days per week you use each news source:
9. Newspapers (Hard Copy): (dropdown menu)
10. Newspapers (Online): (dropdown menu)
11. News Magazines (Hard Copy): (dropdown menu)
12. News Magazines (Online): (dropdown menu)
13. Blogs: (dropdown menu)
14. TV: (dropdown menu)
15. Radio: (dropdown menu)

Do you have any experience with the following? Check all that apply or please select "none" if you prefer to not answer:
16. Human Papillomavirus:
O Personal history   O Family history O None

17. Prostate Cancer:
O Personal history   O Family history O None

18. Food Poisoning:
O Personal history   O Family history O None

19. Breast Cancer:
O Personal history   O Family history O None

20. Have you or anyone in your family ever participated in a clinical trial research study?
O No   O Yes O Don't know

News Reaction
Interest and Preference Survey

For each of the following statements, please indicate how much you disagree or agree by selecting the appropriate response along the indicated range (Note: the far left button implies strong disagreement while the far right button implies strong agreement).

21. I would like to explore strange places.
Strongly O O O O O O O Strongly
Disagree   Agree

22. I get restless when I spend too much time at home.
Strongly O O O O O O O Strongly
Disagree   Agree

23. I like to do frightening things.
Strongly O O O O O O O Strongly
Disagree   Agree

24. I like wild parties.
Strongly O O O O O O O Strongly
Disagree   Agree

25. I would like to take off on a trip with no pre-planned routes or timetables.
Strongly O O O O O O O Strongly
Disagree   Agree

26. I prefer friends who are excitingly unpredictable.
Strongly O O O O O O O Strongly
Disagree   Agree

27. I would like to try bungee jumping.
Strongly O O O O O O O Strongly
Disagree   Agree

28. I would love to have new and exciting experiences, even if they are illegal.
Strongly O O O O O O O Strongly
Disagree   Agree

News Reaction

Preference Survey, continued

For each of the following statements, please indicate how much you disagree or agree by selecting the appropriate response along the indicated range (Note: the far left button implies strong disagreement while the far right button implies strong agreement).

29. I would rather do something requiring less thought than something that challenges my thinking abilities.
Strongly   O   O   O   O   O   O   O   Strongly
Disagree   Agree

30. I don't like to have the responsibility of handling a situation that requires a lot of thinking.
Strongly   O   O   O   O   O   O   O   Strongly
Disagree   Agree

31. I try to anticipate and avoid situations where I will be likely to have to think in depth about something.
Strongly   O   O   O   O   O   O   O   Strongly
Disagree   Agree

32. I would prefer complex to simple problems.
Strongly   O   O   O   O   O   O   O   Strongly
Disagree   Agree

33. I like having the responsibility of handling a situation that requires a lot of thinking.
Strongly   O   O   O   O   O   O   O   Strongly
Disagree   Agree

34. Thinking is not my idea of fun.
Strongly   O   O   O   O   O   O   O   Strongly
Disagree   Agree

35. I would rather do something that requires little thought than something that is sure to challenge my thinking abilities.
Strongly   O   O   O   O   O   O   O   Strongly
Disagree   Agree

36. I try to anticipate and avoid situations where there is likely chance I will have to think in depth about something.
Strongly   O   O   O   O   O   O   O   Strongly
Disagree   Agree

37. I find satisfaction in deliberating hard and for long hours.
Strongly O O O O O O O Strongly
Disagree   Agree

38. I only think as hard as I have to.
Strongly O O O O O O O Strongly
Disagree   Agree

39. I like tasks that require little thought once I've learned them.
Strongly O O O O O O O Strongly
Disagree   Agree

40. The idea of relying on thought to make my way to the top appeals to me.
Strongly O O O O O O O Strongly
Disagree   Agree

41. I really enjoy a task that involves coming up with new solutions to problems.
Strongly O O O O O O O Strongly
Disagree   Agree

42. Learning new ways to think doesn't excite me very much.
Strongly O O O O O O O Strongly
Disagree   Agree

43. I prefer my life to be filled with puzzles that I must solve.
Strongly O O O O O O O Strongly
Disagree   Agree

44. The notion of thinking abstractly is appealing to me.
Strongly O O O O O O O Strongly
Disagree   Agree

45. I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought.
Strongly O O O O O O O Strongly
Disagree   Agree

46. I feel relief rather than satisfaction after completing a task that required a lot of mental effort.
Strongly O O O O O O O Strongly
Disagree   Agree

47. I prefer to think about small, daily projects rather than long-term ones.
Strongly O O O O O O O Strongly
Disagree   Agree

48. It's enough for me that something gets the job done; I don't care how or why it works.

Strongly O O O O O O O Strongly
Disagree   Agree

49. I usually end up deliberating about issues even when they do not affect me personally.

Strongly O O O O O O O Strongly
Disagree   Agree

News Reaction
Involvement With Human Papillomavirus

Now, consider the topic of human Papillomavirus and how it might affect you. Please answer each of the following questions.
Indicate how much you disagree or agree by selecting the appropriate response along the indicated range (Note: the far left button implies strong disagreement while the far right button implies strong agreement).

50. A local outbreak of human Papillomavirus would affect me personally.
Strongly O O O O O O O Strongly
Disagree   Agree

51. A local outbreak of human Papillomavirus would have a big impact on my life.
Strongly O O O O O O O Strongly
Disagree   Agree

52. A local outbreak of human Papillomavirus would have little effect on me personally.
Strongly O O O O O O O Strongly
Disagree   Agree

53. Whether or not there is a local outbreak of human Papillomavirus would have little impact on how I live.
Strongly O O O O O O O Strongly
Disagree   Agree

54. It is difficult for me to think of ways that a local outbreak of human Papillomavirus would affect my life.
Strongly O O O O O O O Strongly
Disagree   Agree

55. My life would be changed if there were a local outbreak of human Papillomavirus.
Strongly O O O O O O O Strongly
Disagree   Agree

56. All in all, the effect of a local outbreak of human Papillomavirus would be small.
Strongly O O O O O O O Strongly
Disagree   Agree

57. A local outbreak of human Papillomavirus would affect my daily life.

Strongly O O O O O O O Strongly
Disagree   Agree

58. My quality of life would not change much if there were a local outbreak of human Papillomavirus.

Strongly O O O O O O O Strongly
Disagree   Agree

59. It is easy for me to think of ways that a local outbreak of the human Papillomavirus would affect my life.

Strongly O O O O O O O Strongly
Disagree   Agree

60. My well-being has little to do with a local outbreak of the human Papillomavirus.

Strongly O O O O O O O Strongly
Disagree   Agree

News Reaction

The next page will take you to a newspaper article about human Papillomavirus. Please read the article and respond to the questions that follow.

News Reaction

Most Americans Exposed to HPV at Some Point, Experts Say

AP Associated Press

Chances are you have been exposed to the potentially cancer-causing human Papillomavirus virus and don't even know it. In fact, at least three out of four sexually active adults under 50 have been infected with a strain of HPV, according to data released by public health officials this week.

In the United States alone, up to 6.2 million new cases occur each year, and at least 20 million Americans are now infected with the genital strain of the most commonly acquired STD, according to public health officials.

Almost all infections cause no symptoms or health problems, but nearly all cases of cervical cancer stem from HPV. Some vulvar, anal, and penile cancers come from HPV, too. Public health officials guess that cervical cancers kill about one-third of those stricken each year.

There are about 200 types of HPV. Only about 40 strains are spread through sexual contact, and only a handful of those are linked with cervical cancer. However, because the disease is so common and can have such a deadly outcome, public health experts rank HPV to be among the most serious health issues facing young men and women in their teens and twenties.

HPV can only be prevented by not having sex. Public health experts strongly suggest becoming more informed as a key first step. A Web site such as www.cdc.gov/std/hpv/ can be useful before talking to a doctor. Having sex with only one partner is also an effective way to decrease your risk. In the future, a new vaccine may offer some protection from HPV-related cancers. Always using a condom can help to reduce risk, too.

Please select "Yes" to confirm that you have completed reading the article and are ready to move on to the next question. Thank you.

61. Confirm reading
 o No   o Yes

News Reaction
Article Questions

Thank you for reading the article on human Papillomavirus. Below are four questions relating to the content of the article. Please answer each question to the best of your ability.

62. According to the article, human Papillomavirus is the most common STD.
O True O False

63. Becoming more informed is a key first step in reducing one's risk for human Papillomavirus.
O True O False

64. Human Papillomavirus causes nearly all cases of cervical cancer, as well as some anal and penile cancers.
O True O False

65. HPV symptoms are easily observed.
O True O False

Reader Feedback
Once again, please consider the article about human Papillomavirus that you read a few moments ago. The four questions below refer to that article.

For each of the following statements, please indicate how much you disagree or agree by selecting the appropriate response along the indicated range (Note: the far left button implies strong disagreement while the far right button implies strong agreement).

66. To me, the advice given in the article is believable.
Strongly O O O O O O O Strongly
Disagree   Agree

67. In my opinion, the information given in the article seems useful.
Strongly O O O O O O O Strongly
Disagree   Agree

68. The advice given in the article is accurate.
Strongly O O O O O O O Strongly
Disagree   Agree

69. The information I read in the article looks true to me.

Strongly   O O O O O O O   Strongly
Disagree   Agree

News Reaction
Future Plans

Below you will see several statements regarding your personal thoughts on human Papillomavirus and things you can do to help protect yourself against the disease.

For each of the following statements, please indicate how much you disagree or agree by selecting the appropriate response along the indicated range (Note: the far left button implies strong disagreement while the far right button implies strong agreement).

70. Human Papillomavirus is a serious threat.
Strongly   O   O   O   O   O   O   O   Strongly
Disagree   Agree

71. Human Papillomavirus is harmful.
Strongly   O   O   O   O   O   O   O   Strongly
Disagree   Agree

72. Human Papillomavirus is a severe threat.
Strongly   O   O   O   O   O   O   O   Strongly
Disagree   Agree

73. I am at risk for human Papillomavirus.
Strongly   O   O   O   O   O   O   O   Strongly
Disagree   Agree

74. It is possible that I will get human Papillomavirus.
Strongly   O   O   O   O   O   O   O   Strongly
Disagree   Agree

75. I am vulnerable to human Papillomavirus.
Strongly   O   O   O   O   O   O   O   Strongly
Disagree   Agree

76. Becoming more informed will act as a key first step in preventing human Papillomavirus.
Strongly   O   O   O   O   O   O   O   Strongly
Disagree   Agree

77. Getting more information will work in deterring human Papillomavirus by acting as a helpful first step.

Strongly   O   O   O   O   O   O   O   Strongly
Disagree   Agree

78. I am able to get more information about how to prevent human Papillomavirus.

Strongly   O   O   O   O   O   O   O   Strongly
Disagree   Agree

79. I am able to get more information about removing the threat of human Papillomavirus.

Strongly   O   O   O   O   O   O   O   Strongly
Disagree   Agree

80. It is easy to get more information about preventing human Papillomavirus.

Strongly   O   O   O   O   O   O   O   Strongly
Disagree   Agree

81. I can get more information to prevent against human Papillomavirus.

Strongly   O   O   O   O   O   O   O   Strongly
Disagree   Agree

News Reaction
Future Plans

Below you will see several statements regarding your future plans and intentions about things you can do to help protect yourself against¹ human Papillomavirus.

For each of the following statements, please indicate how much you disagree or agree by selecting the appropriate response along the indicated range (Note: the far left button implies strong disagreement while the far right button implies strong agreement).

82. I intend to seek more information about human Papillomavirus.

Strongly O O O O O O O Strongly
Disagree   Agree

83. I am planning to seek more information about human Papillomavirus.

Strongly O O O O O O O Strongly
Disagree   Agree

84. I intend to use a condom every time I have sex as a way to decrease my risk of human Papillomavirus.

Strongly O O O O O O O Strongly
Disagree   Agree

85. I am planning to use a condom every time I have sex as a way to decrease my risk of human Papillomavirus.

Strongly O O O O O O O Strongly
Disagree   Agree

86. I intend to have sex with only one partner as a way to decrease my risk of human Papillomavirus.

Strongly O O O O O O O Strongly
Disagree   Agree

87. I am planning to have sex with only one partner as a way to decrease my risk of human Papillomavirus.

Strongly O O O O O O O Strongly
Disagree   Agree

(Page 11 of the pilot test: note that in the online version the phrases "comprehensive Web site," 'question and answer segment," and "CDC Web site" were all links to appropriate Centers for Disease Control Web pages)

News Reaction

Thank you for taking the time to complete our survey. Please use the space below to enter your Wotmania user name. One user name will be selected at random to receive the $100 prize. The site administrator will contact the winner about one week after data collection ends.

We also would like to encourage you to learn more about how to protect yourself from human Papillomavirus.

The Centers for Disease Control and Prevention has a comprehensive Web site that offers everything from basic facts to treatment options. This includes an informative question and answer segment intended to cover most people's basic concerns.

HPV information specifically relevant for men can be found on the CDC Web site as well.

Thank you again for your time.

Lastly, please use the space below to leave any comments you have about our survey.

(blank box for qualitative comments)

APPENDIX D:

Data Collection Instrument

Each respondent first received the e-mail included below. Those wishing to participate followed a link to the survey.

Subject: You've been chosen for a survey!

Dear {NAME},

You've been randomly chosen from the Virtual Consumer Research Group (VCRG) Panel at the University of Texas at Austin to participate in an online survey.

As more and more media outlets cover health topics, it is important to learn more about how people understand and react to this news coverage. This study is intended to learn more about how people learn from these news stories and what can make them better. .

You may complete this survey at any time of your choice during the next 7 days and it should take you no more than 25 minutes to finish. Your responses will help us understand what readers think of health news stories and will remain strictly confidential. In fact, you will not be asked to identify yourself individually within the survey. By completing the survey, you are indicating your voluntary consent to participate in this study; however, you may discontinue or refuse to take part at anytime, and your responses will not be processed unless you submit the survey upon completion.

If you complete the survey, you will be entered into a cash drawing for one of 10 $100 prizes. To participate, please proceed to the following URL: {URL INSERTED HERE}http://adresearch.advertising.utexas.edu/survey005.html.

If you should have any questions about this survey before you begin, please feel free to contact Brad Love, via e-mail at lovebrad@msu.edu.

Thanks for your participation!

The link included in the e-mail randomly sent the participants to one of the five treatment conditions, each of which began with the following informed consent notice:

"Welcome, and thank you for taking the time to participate in our study, which should last less than 25 minutes!

INTRODUCTION

You are being invited to participate in a research study about how people view mass media coverage of health topics. Researchers at Michigan State University will perform the study. Participants will need about 25 minutes to complete the survey. In return for completing the survey, respondents will be entered into drawing to win one of 10 $100 prizes. Prizes will be distributed in approximately one month after data collection is complete.

PURPOSE

The purpose of this study is to determine how people understand and view coverage of health-related topics in the mainstream media.

WHAT IS INCLUDED IN THIS PROJECT?

Participants will be asked to read an online news story and complete survey questions regarding the story and their reactions to it. Participants will also answer survey questions about their personal views on the world around them. Completing the reading and questions is estimated to take 25 minutes.

PROCEDURE

If you decide to take part in this study, you will be asked to consent to the items discussed below. All of the information collected for this project will be kept confidential to the maximum extent allowed by the law. You may be asked to complete a series of surveys about your reactions to the news media and your views on your environment.

PARTICIPATION

Participation in this study is entirely voluntary. In addition, should you choose to participate in the overall study, you may still decline to participate in any segment of the survey. You may also choose to discontinue your participation at any time. Any refusal to participate or decision to discontinue will not affect any future opportunities to participate in surveys offered through this online panel.

RISKS

Although it is highly unlikely, there is a chance that you might feel uncomfortable with some of the questions during the course of the survey because they deal with health topics. If at any time during the course of the survey, you wish to refrain from answering a question or simply wish to stop

participating, the survey can be postponed and/or terminated.
Participation in this study presents no physical threat.

BENEFITS

We cannot and do not guarantee you will directly benefit if you take part in this study. Through your answers, we hope to gain valuable information about the use of news media and more specifically coverage of health-related issues. It is our hope that the information we receive from you will help improve the quality of media coverage of health topics.

PAYMENT TO SUBJECTS

As a participant in this research study, you will be entered into a random drawing to win one of 10 prizes of $100. Every respondent will have an equal opportunity to win a $100 prize. As such, we cannot guarantee payment to any individual, but everyone completing the survey will be equally likely to receive $100 for his or her time.

COSTS

Participation in this project will not cost anything. There will be no financial responsibility for any respondent nor any penalty for not participating.

ALTERNATIVES

The alternative to participating in this research study is to decline. Participation is purely voluntarily and for research purposes only.

CONFIDENTIALITY

Investigators will keep secret all research related to records and information gathered by this study. Throughout the study, all information from surveys will be stored in a manner to assure confidentiality of the subjects to the maximum extent allowable under law. Your privacy will be protected to the maximum extent allowable by law. The investigators will not reveal your identity if they publish the results of the study.

QUESTIONS

Through this form, the investigators have tried to answer questions to your satisfaction. If you have any particular questions about this study, please contact Brad Love by phone: (517) 432-6186, e-mail: lovebrad@msu.edu, or regular mail: 305 Communication Arts & Sciences, East Lansing MI 48824. If you have any questions or concerns regarding your rights as a study participant, or are dissatisfied at any time with any aspect of this study, you may contact - anonymously, if you wish - Peter Vasilenko, Ph.D., Director of the Human Subject Protection Programs at Michigan State University, by phone: (517) 355-2180, fax: (517) 432-4503, email: irb@msu.edu, or regular mail: 202 Olds Hall, East Lansing, MI 48824.

CONSENT

The investigator(s) gave you information about what will be done in this research study. You also were told how it will be done, what you will have to do, and how long the research will take. The information in this form attempted to tell you about any inconvenience, discomfort, or risks you might experience due to this research.

By clicking below, you agree to take part in this study as a research subject. You are aware that you may quit or refuse to participate in certain parts of the research at any time."

Accept   Decline

Those agreeing to participate continued to the survey. Those declining to participate were taken to the Michigan State University homepage. The survey instrument appeared as follows. Please note that the format used for online testing has been approximated here as best as possible. Certain formatting norms of online publication, such as thinner columns, do not translate well to the printed page. In addition, certain functional survey items such as answer-selection buttons do not always reproduce in word-processing documents. Pages of the survey are indicated in parentheses before the start of each page. In the online version, page progress was indicated by text at the bottom of each page that let respondents know both their progress and the pages remaining by saying, for example, "Page 6 of 14."

(Page 1 of the final survey)

News Reaction

Survey Outline

Thank you for agreeing to complete our survey. We appreciate you taking the time to offer your opinions.

The survey will take you through a few questions about your personal preferences, ask you about information obtained from a newspaper article, and then finish with some more survey questions.

Also, please maximize your Internet browser window to full-screen size as you take the survey. This will ensure that all the questions are visible.

Thank you again for your time. Please click the button below to continue.

News Reaction

We would like to start by asking you some general questions. The following items are all intended to help us learn a little about your background.

Please select the appropriate button for your gender.

1. Gender

Male

Female

2. What is your age? (Please enter "99" if you prefer to not answer.)

[   ]

3. What is your ethnicity? Please check multiple categories if appropriate.

Asian / Pacific Islander/Native Hawaiian

Black / African American

Hispanic / Latino

White

Native American / Alaska Native

Other: [   ]

Prefer not to respond

4. What is your country of residence?

U.S.A.

Canada

Mexico

Other: [   ]

5. What is your current relationship status (optional)?

Single

Committed Relationship

Engaged

Married

.

News Reaction Continuing with the general questions, we would like to know a little about your media use habits.

6. Where do you get your news? Please mark the items that best fit your situation.

Newspapers (Hard Copy)

Newspapers (Online)

News Magazines (Hard Copy)

News Magazines (Online)

Blogs

T.V.

Radio

I don't regularly follow the news.

* 7. Newspapers (Hard Copy):

| 0 ▾ |

* 8. Newspapers (Online):

| 0 ▾ |

* 9. News Magazines (Hard Copy):

| 0 ▾ |

* 10. News Magazines (Online):

| 0 ▾ |

* 11. Blogs:

| 0 ▾ |

* 12. TV:

0 ▾

* 13. Radio:

News Reaction

Still thinking in general terms, we would like to know about your experiences with certain medical situations. Do you have any experience with the following?
Check all that apply or please select "none" if you prefer to not answer:

14. Human Papillomavirus:

Personal history	Family history	Other experience	None

15. Prostate Cancer:

Personal history	Family history	Other experience	None

16. Food Poisoning:

Personal history	Family history	Other experience	None

17. Breast Cancer:

Personal history	Family history	Other experience	None

18. Have you, any close friends, or anyone in your family ever participated in a clinical trial research study?

No

Yes

Don't know

News Reaction

Interest and Preference Survey

For each of the following statements, please indicate how much you disagree or agree by selecting the appropriate response along the indicated range (Note: the far left button implies strong disagreement while the far right button implies strong agreement).

19. I would like to explore strange places.

Strongly Disagree				Strongly Agree
1	2	3	4	5

20. I get restless when I spend too much time at home.

Strongly Disagree				Strongly Agree
1	2	3	4	5

21. I like to do frightening things.

Strongly Disagree				Strongly Agree
1	2	3	4	5

22. I like wild parties.

Strongly Disagree				Strongly Agree
1	2	3	4	5

23. I would like to take off on a trip with no pre-planned routes or timetables.

Strongly Disagree				Strongly Agree
1	2	3	4	5

24. I prefer friends who are excitingly unpredictable.

Strongly Disagree				Strongly Agree
1	2	3	4	5

25. I would like to try bungee jumping.

Strongly Disagree				Strongly Agree
1	2	3	4	5

26. I would like to have new and exciting experiences, even if they
    are illegal.

Strongly Disagree				Strongly Agree
1	2	3	4	5

News Reaction

Preference Survey, continued

For each of the following statements, please indicate how much you disagree or agree by selecting the appropriate response along the indicated range (Note: the far left button implies strong disagreement while the far right button implies strong agreement).

27. I would prefer complex problems to simple ones.
Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

28. I like having the responsibility of handling a situation that requires a lot of thinking.
Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

29. Thinking is not my idea of fun.
Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

30. I would rather do something that requires little thought than something that is sure to challenge my thinking abilities.
Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

31. I try to anticipate and avoid situations where there is a good chance I will have to think in depth about something.
Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

32. I find satisfaction in thinking hard and for long hours.
Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

33. I only think as hard as I have to.
Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

34. I like tasks that require little thought once I've learned them.
Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

News Reaction

Preference Survey, continued

Again, for each of the following statements, please indicate how much you disagree or agree by selecting the appropriate response along the indicated range (Note: the far left button implies strong disagreement while the far right button implies strong agreement).

35. The idea of relying on thought to make my way to the top appeals to me.
Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

36. I really enjoy a task that involves coming up with new solutions to problems.
Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

37. Learning new ways to think does not excite me very much.
Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   `   Agree

38. I prefer my life to be filled with puzzles that I must solve.
Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

39. The notion of thinking abstractly is appealing to me.
Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

40. I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought.
Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

41. I feel relief rather than satisfaction after completing a task that required a lot of mental effort.
Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

42. I prefer to think about small, daily projects rather than long-term ones.

Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

43. It's enough for me that something gets the job done; I don't care how or why it works.

Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

44. I usually end up thinking about issues even when they do not affect me personally.

Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

News Reaction

Now, consider the topic of human Papillomavirus and how it might affect you. Please answer each of the following questions.

Indicate how much you disagree or agree by selecting the appropriate response along the indicated range (Note: the far left button implies strong disagreement while the far right button implies strong agreement).

45. A local outbreak of human Papillomavirus would affect me personally.
Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

46. A local outbreak of human Papillomavirus would have a big impact on my life.
Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

47. A local outbreak of human Papillomavirus would have little effect on me personally.
Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

News Reaction

The next page will take you to a newspaper article about human Papillomavirus. Please read the article and respond to the questions that follow.

News Reaction

Most Americans Exposed to HPV at Some Point, Experts Say

AP Associated Press

Chances are you have been exposed to the potentially cancer-causing human Papillomavirus virus and don't even know it. In fact, at least three out of four sexually active adults under 50 have been infected with a strain of HPV, according to data released by public health officials this week.

In the United States alone, up to 6.2 million new cases occur each year, and at least 20 million Americans are now infected with the genital strain of the most commonly acquired STD, according to public health officials.

Almost all infections cause no symptoms or health problems, but nearly all cases of cervical cancer stem from HPV. Some vulvar, anal, and penile cancers come from HPV, too. Public health officials guess that cervical cancers kill about one-third of those stricken each year.

There are about 200 types of HPV. About 40 strains are spread through sexual contact, and a handful of those are the ones linked with cervical cancer. However, because the disease is so common and can have such a deadly outcome, public health experts rank HPV to be among the most serious health issues facing young men and women in their teens and twenties.

HPV can only be prevented by not having sex. Public health experts strongly suggest becoming more informed as a key first step. A Web site such as the Center for Disease Control's at www.cdc.gov/std/hpv/ can be useful before talking to a doctor. Having sex with only one partner is also an effective way to decrease your risk. In the future, a new vaccine may offer some protection from HPV-related cancers. Always using a condom can help to reduce risk, too.

  Please select "Next" to confirm that you have completed reading the article and are ready to move on to the next question. Thank you.

News Reaction

Article Questions

Thank you for reading the article on human Papillomavirus. Below are four questions relating to the content of the article. Please answer each question to the best of your ability.

48. According to the article, human Papillomavirus (HPV) is the most common STD.

      True   False

49. Becoming more informed is a key first step in reducing one's risk for human Papillomavirus.

      True   False

50. Human Papillomavirus causes nearly all cases of cervical cancer, as well as some anal and penile cancers.

      True   False

51. HPV symptoms are easily observed.

      True   False

Reader Feedback

Once again, please consider the article about human Papillomavirus that you read a few moments ago. The four questions below refer to that article.

For each of the following statements, please indicate how much you disagree or agree by selecting the appropriate response along the indicated range (Note: the far left button implies strong disagreement while the far right button implies strong agreement).

52. To me, the advice given in the article is believable.

Strongly o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

53. In my opinion, the information given in the article seems useful.

Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

54. The advice given in the article is accurate.

Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

55. The information I read in the article looks true to me.

Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

News Reaction

Future Plans

Below you will see several statements regarding your personal thoughts on human Papillomavirus and things you can do to help protect yourself against the disease.

For each of the following statements, please indicate how much you disagree or agree by selecting the appropriate response along the indicated range (Note: the far left button implies strong disagreement while the far right button implies strong agreement).

56. Human Papillomavirus is a serious threat.
Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

57. I am at risk for human Papillomavirus.
Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

58. Human Papillomavirus is harmful.
Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

59. It is possible that I will get human Papillomavirus.
Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

60. Human Papillomavirus is a severe threat.
Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

61. I am vulnerable to human Papillomavirus.
Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

News Reaction

Future Plans

Once again, you will see below more statements regarding your personal thoughts on human Papillomavirus and things you can do to help protect yourself against the disease.

For each one, please continue to indicate how much you disagree or agree by selecting the appropriate response along the indicated range (Note: the far left button implies strong disagreement while the far right button implies strong agreement).

62. I am able to get more information about how to prevent human Papillomavirus.

Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

63. Becoming more informed will act as a key first step in preventing human Papillomavirus.

Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

64. Getting more information will work in deterring human Papillomavirus by acting as a helpful first step.

Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

65. I am able to get more information about removing the threat of human Papillomavirus.

Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

66. It is easy to get more information about preventing human Papillomavirus.

Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

67. I can get more information to prevent against human Papillomavirus.

Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

(Page 14: note that in the online version the phrases "comprehensive Web site," 'question and answer segment," and "CDC Web site" were all links to appropriate Centers for Disease Control Web pages)

News Reaction

Future Plans

Below you will see several statements regarding your future plans and intentions about things you can do to help protect yourself against human Papillomavirus.

For each of the following statements, please indicate how much you disagree or agree by selecting the appropriate response along the indicated range (Note: the far left button implies strong disagreement while the far right button implies strong agreement).

68. I intend to seek more information about human Papillomavirus.
Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

69. I am planning to seek more information about human Papillomavirus.
Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

70. I intend to use a condom every time I have sex as a way to decrease my risk of human Papillomavirus.
Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

71. I am planning to use a condom every time I have sex as a way to decrease my risk of human Papillomavirus.
Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

72. I intend to have sex with only one partner as a way to decrease my risk of human Papillomavirus.
Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

73. I am planning to have sex with only one partner as a way to decrease my risk of human Papillomavirus.
Strongly   o 1   o 2   o 3   o 4   o 5   o 6   o 7   Strongly
Disagree   Agree

Thank you

Thank you for taking the time to complete our survey. Ten people who have completed the survey will be selected at random to receive a $100 prize. The research panel administrator will contact the winners as soon as possible after data collection ends.

We also would like to encourage you to learn more about how to protect yourself from human Papillomavirus.

The Centers for Disease Control and Prevention has a comprehensive Web site that offers everything from basic facts to treatment options. This includes an informative question and answer segment intended to cover most people's basic concerns. The American Social Health Association also offers an easy-to-read introductory site for anyone concerned about the HPV virus.

HPV information specifically relevant for men can be found on the CDC Web site as well.

Thank you again for your time.

Lastly, please use the space below to leave any comments you have about our survey.

74. Comments
(blank text box)

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