

THREAT AND EFFICACY MESSAGES IN NEWSPAPER ARTICLES ON
HEART DISEASE AND TYPE 2 DIABETES

By
Susana Peinado

A thesis submitted to Johns Hopkins University
in conformity with the requirements for the degree of Master of Arts

Communication in Contemporary Society

Baltimore, Maryland
August 2008

© 2008 Susana Peinado
All Rights Reserved

Abstract

The public is regularly exposed to health risk messages, including messages about heart disease and diabetes, through news media, but little is known about whether these messages are presented in such a way as to motivate risk-reducing behaviors. This study used the Extended Parallel Process Model (EPPM), a theoretical framework for designing health risk messages, in a content analysis of newspaper articles about heart disease and type 2 diabetes. The analysis identified the presence of threat (severity and susceptibility) and efficacy (response efficacy and self-efficacy) messages in articles, the framing techniques used by articles to convey these messages, and the differences between articles about heart disease and diabetes. This study revealed that the vast majority of articles about disease prevention may fail to have a positive effect on behavior. Only 10% of articles included all four components of the EPPM. More than half (55%) of the articles were missing one or both threat components and approximately three-quarters (73%) of the articles were missing one or both efficacy components. Two-thirds (66%) of articles were missing a self-efficacy message. Echoing previous research, articles about diabetes were significantly ($p < .0001$) more likely to emphasize race or ethnic origin in the context of susceptibility to the disease.

Readers:

Dr. Erika Falk

Dr. Lisa Murray-Johnson

Dr. Susan Morris

Preface

Acknowledgments

I would like to sincerely thank Dr. Erika Falk for her excellent feedback and encouragement during the writing of this thesis and throughout my time in the Communication program. Thank you also to Dr. Lisa Murray-Johnson, who devoted hours of her precious time to helping me refine and improve this paper. I am extremely grateful.

My parents, Susan and Art Peinado, deserve special thanks for their unwavering love, generosity, and support in this and all things. Thank you also to my grandmother, Berneice Earle, for helping to make my education possible.

I would also like to thank Dr. Polly Phipps, who welcomed me into her home and enabled me to complete this thesis without having to move out of state. She has been a very generous and supportive friend, and I will be forever grateful.

Finally, without the emotional support of my fiancé, David Mann, this thesis would not have been possible. He has been a constant source of inspiration and strength. Thank you.

Table of Contents

Abstract.....	ii
Preface.....	iii
List of Tables	v
Introduction.....	1
Heart Disease and Diabetes	2
Extended Parallel Process Model (EPPM)	4
Purpose of Research.....	9
Literature Review.....	11
Coverage of Health Risks	11
Coverage of Heart Disease and Diabetes.....	13
Message Design	15
Threat	15
Efficacy	19
Summary.....	22
Method.....	24
Sample Selection.....	24
Timeframe.....	25
Coding Variables	25
Disease and prevention focus.....	26
Threat messages.....	26
Efficacy messages.....	27
Trigger.....	27
Inter-coder Reliability.....	27
Data Analysis	28
Results.....	29
Discussion.....	42
How can health professionals help journalists provide more effective disease prevention information to the public?.....	47
Limitations	50
Future research.....	52
Conclusion	54
Appendix.....	55
References.....	65
Curriculum Vitae	77

List of Tables

Table 1: Articles by Subject with Four EPPM Components.....29

Table 2: Articles by Primary Prevention Focus with Four EPPM Components.....30

Table 3: Absence of Threat Messages in Articles.....32

Table 4: Absence of Efficacy Messages in Articles.....33

Table 5: Characteristics of Severity Messages in Articles.....34

Table 6: Characteristics of Susceptibility Messages in Articles.....36

Table 7: Characteristics of Response Efficacy Messages in Articles.....38

Table 8: Characteristics of Self-Efficacy Messages in Articles.....39

Threat and Efficacy Messages in Newspaper Articles on Heart Disease and Type 2 Diabetes

Millions of Americans are regularly exposed to messages about health and disease through news media. As a result, news media influence has been associated with public perceptions of the risk of disease (e.g., see Combs and Slovic, 1979; Covello and Peters, 2002; Scott and Curbow, 2006) as well as knowledge and performance of health behaviors (Stryker, 2003; Stryker, Moriarty, and Jensen; 2005; Yanovitzky and Blitz, 2000). Yet, despite its identifiable role in influencing public health, news media provide surprisingly little information on disease prevention (e.g., see Atkin, Smith, McFeters, and Ferguson, 2008; Berry, Wharf-Higgins, and Naylor, 2007; Moriarty and Stryker, 2008; Stryker, Solky, and Emmons, 2005). It is therefore important to examine whether the disease prevention information that does appear in newspapers is presented in a way that will motivate risk-reducing behaviors. This paper uses the Extended Parallel Process Model, a theoretical framework for designing health risk messages, to examine prevention information in newspapers for two diseases with high mortality rates, but which are also highly preventable: heart disease and type 2 diabetes.

Despite the growing influence of other media sources, newspapers are still an important source of health information to the public. A survey by the National Cancer Institute (2003) found that 75% of respondents paid attention to information about health or medical topics in newspapers. Newspapers indeed acknowledge their role as a source of health information. In 2007, newspapers included health and medical coverage “among their top priorities.” In the same year, health and medical coverage made up approximately 7% of newspaper coverage (Project for Excellence in Journalism, 2008).

It is worth noting that there is an intrinsic conflict between the concerns of news media and the concerns of the public health community. Health professionals often see medical problems and solutions from a social perspective, and have criticized news media for presenting only individual-level solutions to health problems. For example, Atkin and Arkin (1990) pointed out that news media coverage often reduces a health issue embedded within a complex social and political structure to a discussion of individual behaviors. They argue this places the responsibility for the health problem on the individual rather than on society. However, the very fact that news media have a tendency to focus on stories about individuals presents an ideal opportunity for influencing individual health behavior. According to Brown and Walsh-Childers (2002), “at the personal level, the mass media may provide information and models that stimulate changes--either positive or negative--in health-related attitudes and behaviors” (p. 453). The goal is to use a proven framework for motivating change in a positive, health-promoting direction.

Heart Disease and Diabetes

Individual-level health behaviors can go a long way toward reducing the risk of heart disease and type 2 diabetes, two of the leading causes of death in the U.S. today (Kung, Hoyert, Xu, and Murphy, 2007). The rate of diabetes is steadily increasing, and diabetics face two to four times the risk of death from heart disease as non-diabetics (American Diabetes Association, 2008). Yet, these two diseases are largely preventable. Research has shown that curbing the major risk factors for heart disease and type 2 diabetes, which can often be accomplished through lifestyle changes, is extremely

effective in preventing the development of these diseases (Ford, et al., 2007; Knowler, et al., 2002).

Heart disease is the hardening and narrowing of the coronary arteries, which supply blood to the heart, due to the buildup of plaque (NHLBI, 2008). It is the leading cause of death in the U.S. for both men and women. The modifiable risk factors for heart disease are high cholesterol, high blood pressure, physical inactivity, being overweight or obese, and smoking (American Heart Association, 2008; Newschaffer, Brownson, and Dusenbury, 1998). Although heart disease remains the leading cause of death today, there has been a substantial decline in the number of deaths from heart disease over the last several decades (American Heart Association, 2008). A recent study on the decline in deaths from heart disease between 1980 and 2000 found that approximately half of this decline can be attributed to reductions in modifiable risk factors (Ford, et al., 2007).

Diabetes is the sixth leading cause of death in the U.S. (Kung, Hoyert, Xu, and Murphy, 2007). The disease is characterized by the body's inability to use insulin to process sugar. About 90% to 95% of all diagnosed cases of diabetes are type 2 (CDC, 2005). Complications of type 2 diabetes include heart disease, stroke, blindness, kidney disease, damage to the nervous system, and amputations. Being overweight or obese and physical inactivity are the modifiable risk factors for type 2 diabetes (Bishop, Zimmerman, and Roesler, 1998; NIDDK, 2006). Unlike heart disease, the rate of diabetes has been consistently increasing, attributed in large part to the growing prevalence of obesity (Mokdad, Bowman, et al., 2001; Mokdad, Ford, et al., 2003). A study that compared the effectiveness of the diabetes medication metformin with lifestyle changes in people at high risk for developing type 2 diabetes found the lifestyle changes,

including changes to diet and level of physical activity, to be significantly more effective than the drug in preventing type 2 diabetes (Knowler, et al., 2002).

The results of the studies by Ford, et al. (2007) and Knowler, et al. (2002) are extremely promising regarding our ability to reduce the incidence and consequences of heart disease and diabetes through lifestyle changes. However, many Americans may not perceive these diseases to be significant health threats. A 2007 Gallup poll on Health and Healthcare revealed that when asked about “the most urgent health problem facing this country at the present time” only 1% of Americans believed it to be heart disease (Saad, 2007). Only 2% of respondents cited diabetes as the most urgent health problem facing the country. This is compared with 14% in the same poll who said cancer was the number one health problem facing this country. The literature on the coverage of health risks in news media reveals that part of the reason the public believes cancer (the second leading cause of death in the U.S.) to be a greater threat than heart disease may be due to the greater coverage cancer receives as well as its portrayal as more fearsome and threatening (Clarke, 1992).

Extended Parallel Process Model (EPPM)

The EPPM is a theoretical model for developing messages about health risks that will motivate risk-reduction behavior. The EPPM is a combination and expansion of constructs and concepts introduced in the Parallel Process Model and Protection Motivation Theory (Witte, 1992a, 1998; Witte, Meyer, and Martell, 2001). The EPPM explains how and why fear appeals succeed as well as how and why they fail (Witte, 1992a, 1994). Witte, Meyer, and Martell (2001) draw a direct connection between fear appeals and health risk messages: “People are naturally fearful of illness, disease,

injuries, and death and want to stay healthy. By definition, most health risk messages are fear appeals” (p. 2). In a 1994 article, Witte argued that “by applying what we know from fear appeal research to risk communication research, we may improve our ability to produce effective risk messages as well as to understand why some risk communications backfire” (p. 231). The EPPM therefore provides a useful model for analyzing the potential effectiveness of messages about the prevention of heart disease and type 2 diabetes in newspaper articles.

According to the EPPM, there are three possible responses to a fear appeal or health risk message (Witte, 1998): 1) no response, 2) message acceptance, and 3) message rejection. The outcome of exposure to a fear-arousing message depends on an individual’s evaluation of the message’s threat and efficacy components. The threat component of the message is evaluated first. This consists of an evaluation of the severity of the threat (i.e., the magnitude of harm expected from the threat) and one’s susceptibility to the threat (i.e., the degree to which one feels at risk for experiencing the threat). If an individual perceives the threat (severity + susceptibility) to be low--i.e., the individual feels that the threat is not serious and/or that he or she is not susceptible to it--he or she is not motivated to evaluate the efficacy component of the message. As a result, evaluation stops and there is no response to the message. If an individual perceives the threat (severity + susceptibility) in the message to be high--i.e., the individual feels that the threat is serious and/or that he or she is susceptible to it--he or she then proceeds with an evaluation of the efficacy component of the message.

The evaluation of the efficacy component consists of an assessment of whether the message’s recommended response will effectively avert the threat (response efficacy)

and whether the individual feels he or she is then capable of carrying out the recommended response (self-efficacy). If an individual perceives efficacy (response efficacy + self-efficacy) to be low--i.e., the individual does not feel the recommended response will reduce the threat and/or he or she does not feel capable of performing it--the individual will respond to the fear by denying the threat, rejecting the message, or reacting against the message (referred to in the EPPM as fear control responses). If efficacy (response efficacy + self-efficacy) is evaluated and perceived to be high--i.e., the individual feels he or she can perform the recommended action and/or the recommended action will reduce the threat--the individual is motivated to adopt and perform the recommended response to avert the threat (referred to in the EPPM as danger control responses).

Health risk messages often attempt to promote self-efficacy by including “specific feasible and easy steps to avert the threat” (Witte, 1994, p. 230). However, when people feel they cannot adopt an effective response because “the response is too hard, too costly, takes too much time, or they think it will not work (i.e., low perceived response and self-efficacy),” they will engage in fear control processes and the message will fail (Witte, 1998, p. 430). Perceived efficacy is critical in determining whether the response to the threatening message is positive behavior change or message rejection. Witte (1994) stated that the efficacy portion of a risk message “is often missing and may be a key reason for negative responses to risk messages” (p. 230). A health risk message that fails because of low perceived efficacy is arguably more harmful than a message that fails due to low perceived threat. If the threat is perceived to be low, the message is simply ignored. However, if the threat is perceived to be high and efficacy is perceived to be low, the

individual may deny the threat and reject the message. As a result, any future health-promoting messages on the topic to which the individual is exposed may be more likely to fail because the threat may continue to be denied (Witte, 1992b).

As mentioned previously, because the EPPM explains how people process messages about health risks, it is a valuable guide for developing effective health risk messages (Witte, 1992a; 1994). Kline and Mattson (2000) pointed out that the EPPM was the first model in fear appeal research to make a direct link between its four message variables (severity, susceptibility, response efficacy, and self-efficacy) and its four perceptual variables (perceived severity, perceived susceptibility, perceived response efficacy, and perceived self-efficacy). This means that a health risk message which includes all four message variables will be more likely to elicit the corresponding perceptual variables and result in positive behavior change.

The EPPM has been used successfully to motivate the adoption of a variety of health-promoting behaviors (e.g., see McKay, Berkowitz, Blumberg, and Goldberg, 2004; Morman, 2000; Stephenson and Witte, 1998; Witte and Allen, 2000; Witte, Berkowitz, Cameron, and McKeon, 1998). Although the EPPM was developed for improving persuasive communication, the model can be used to improve communication about health risks in any context. In general, when people feel they do not have control over a health risk, they are more fearful (Gray and Ropeik, 2002; Ropeik and Slovic, 2003). The objective of health risk messages designed using the EPPM is to ensure that people are not left feeling fearful and out of control. The recommended response should be stated explicitly in the health risk message in order to make it clear to people what they can do to avert the threat (Witte, Meyer, and Martell, 2001). The efficacy

component, if designed properly, will provide people with a response that will avert or reduce the threat and give them the information they need to follow through with that response.

There have not been any studies that have systematically tested the effects of subtracting each element of the EPPM. For example, there are no studies that demonstrate the effect of a message that only includes one of the threat components and/or one of the efficacy components. Additionally, there are no studies that answer the question of how effects would vary depending on which component was removed from a message. However, the EPPM proposes an additive effect of the two threat components for overall perceived threat and the two efficacy components for overall perceived efficacy (Witte, 1998). Witte, Cameron, McKeon, and Berkowitz (1996) confirmed with a factor analysis that severity and susceptibility are unique elements that combine to form the threat construct, and that response efficacy and self-efficacy combine to form the efficacy construct. Studies often follow this model by combining perceived severity and perceived susceptibility to create an overall threat construct and combining perceived response efficacy and perceived self-efficacy to create an overall efficacy construct (e.g., see Morman, 2000; Stephenson and Witte, 1998). Studies have generally found that high-threat/high-efficacy messages result in higher perceptions of threat and efficacy and have the greatest positive effect on attitudes toward the recommended behavior, intentions to perform the recommended behavior, and performance of the recommended behavior (e.g., see McKay, Berkowitz, Blumberg, and Goldberg, 2004; Morman, 2000; Stephenson and Witte, 1998; Witte and Allen, 2000). Logically, it would seem that if one of the threat or efficacy components were missing, the result would be a lower threat or

lower efficacy message, which would result in lower perceptions of threat and efficacy. This would in turn reduce the positive effect on attitude and behavior.

In a meta-analysis, Witte and Allen (2000) demonstrate that each of four message components of the EPPM (severity, susceptibility, response efficacy, and self-efficacy) had an effect on attitude toward the recommended response, intention to perform the recommended response, and behavior. They also show that the stronger each of the message components, the greater effect it had on attitude, intention, and behavior. The implication therefore is that if one of the four EPPM message components were missing, the message as a whole would have a diminished positive effect on attitude and behavior.

Purpose of Research

Newspapers play an important role in providing the public with information about health risks. A substantial percentage of the American public is exposed to health risk messages, including messages about heart disease and diabetes, in newspapers everyday. Heart disease and type 2 diabetes are among the most common fatal, yet preventable, diseases in the U.S., and there are well-identified behaviors one can adopt to reduce the risk of developing these diseases. It is therefore important to determine whether newspaper articles about disease prevention are optimally structured to motivate healthy behaviors. An analysis of newspaper articles using the EPPM will reveal whether newspapers communicate information about heart disease and diabetes to the public in such a way as to motivate risk-reducing behavior. A lack of either adequate threat or efficacy messages in newspaper articles about these diseases could lead to the rejection of health-promoting messages. Therefore, this study can provide information to public health advocates as to how heart disease and diabetes prevention information is being

presented in newspapers and how it may be altered to contribute to improved health outcomes.

Previous research has used the EPPM to analyze messages in breast cancer brochures (Kline and Mattson, 2000), on eating disorder Web sites (Lapinski, 2006), and on Web sites that promote physical activity (Bonnar-Kidd, 2006). However, there has not been any research that has applied the EPPM to the analysis of newspaper articles about heart disease and type 2 diabetes. In addition, research that has analyzed health risk and risk-reducing information in news media has largely focused on cancer (e.g., see Atkin, Smith, McFeters, and Ferguson, 2008; Freimuth, Greenberg, DeWitt, and Romano, 1984; Moriarty and Stryker, 2008; Stryker, Moriarty, and Jensen, 2005).

In their call for future research on health content in media sources, Atkin and Arkin (1990) discuss the need for content analyses that make note of more than “simple counts” for the purpose of tracking media trends. They argue that “while these types of content information are valuable, the highest priority should be given to analyses of message attributes that are sensitive to potential audience effects” (p. 34). Atkin and Arkin call for the application of theory to message content. This paper attempts to contribute to this effort by applying the Extended Parallel Process Model, a theoretical framework for designing health messages, to the content of newspaper articles on heart disease and type 2 diabetes.

Literature Review

A review of the literature reveals that news media do not seem to be doing a particularly good job of communicating about serious health risks. Lower-risk diseases tend to receive more coverage than diseases such as heart disease and diabetes, which pose a greater threat to public health. This skewed coverage can result in distorted perceptions of risk. Articles on health risks also tend to lack risk-reduction information and efficacy messages.

Coverage of Health Risks

News media, including newspapers, often portray health risks inaccurately. Typically, studies show that diseases receive less news media coverage than catastrophic events although diseases claim many more lives (Combs and Slovic, 1979; Singer and Endreny, 1993). For example, an analysis of newspaper coverage by Combs and Slovic (1979) found that “whereas all diseases took about 16 times as many lives as all accidents, there were more than three times as many articles about accidents in which almost seven times as many deaths were noted” (p. 841). Their findings were even more extreme for homicides, which claim even fewer lives than accidents and diseases, but still provided content for three times as many articles which were more than twice the length of articles about deaths from diseases. Recent data shows that disasters and accidents still receive more coverage than health topics in most news media. Newspapers, however, may be the single medium in which health and medicine now receive more coverage than disasters and accidents (Project for Excellence in Journalism, 2008).

Additionally, the amount of coverage given to diseases generally does not correspond with actual morbidity and mortality rates (Adelman and Verbrugge, 2000;

Berry, Wharf-Higgins, and Naylor, 2007; Covello and Peters, 2002; Freimuth, Greenberg, DeWitt, and Romano, 1984; Frost, Frank, and Maibach, 1997; Singer and Endreny, 1993). This is also true of coverage of heart disease and diabetes which tend to receive less coverage than other diseases with lower mortality rates (Adelman and Verbrugge, 2000; Berry, Wharf-Higgins, and Naylor, 2007; Covello and Peters, 2002; Frost, Frank, and Maibach, 1997). Health risks are generally more likely to receive news media coverage if they are new and rare (Adelman and Verbrugge, 2000; Singer and Endreny, 1993).

Risk perceptions include judgments about the seriousness or severity of a health threat and one's susceptibility to it, or the likelihood of experiencing the threat. The overrepresentation of some health risks in news media can contribute to an inaccurate, heightened public perception of the threat posed by these risks. Covello and Peters (2002) found that the skewed media coverage of women's health directly corresponded with women's perceptions of the most threatening health risks. For example, women perceived breast cancer to be a greater health risk than heart disease. As a result, significantly more women feared breast cancer than heart disease, when in reality heart disease claims many more lives than breast cancer. Scott and Curbow (2006) also found in their interviews of college-age women that these young women found breast cancer and cancer to be more frightening than heart disease. In comparing newspaper coverage to people's perceptions of the most common causes of death, Combs and Slovic (1979) found that perceptions echoed the bias. People believed the greatest causes of death to be those that received the most news media coverage.

News media coverage of health risks also tends to lack messages about risk-reduction and self-efficacy. Content analyses of cancer coverage have found that articles often lack information about how to reduce health risks. Studies that have investigated the frequency of prevention information in news media sources have generally found discussions of prevention in fewer than half of news stories (Atkin, Smith, McFeters, and Ferguson, 2008; Berry, Wharf-Higgins, and Naylor, 2007; Freimuth, Greenberg, DeWitt, and Romano, 1984; Moriarty and Stryker, 2008; Stryker, Moriarty, and Jensen, 2005; Stryker, Solky, and Emmons, 2005). Even fewer news stories make prevention a main topic (Freimuth, Greenberg, DeWitt, and Romano, 1984; Stryker, Moriarty, and Jensen, 2005). Not surprisingly, a lack of self-efficacy messages has also been found in newspaper stories on cancer prevention and detection (Moriarty and Stryker, 2008).

Coverage of Heart Disease and Diabetes

Both heart disease and diabetes have had a consistent presence in newspapers for at least the last two to three decades (Adelman and Verbrugge, 2000; Finnegan, Viswanath, and Hertog, 1999). In fact, newspaper articles on diabetes have consistently increased over that time (Adelman and Verbrugge, 2000). One study (Adelman and Verbrugge, 2000) even found that newspaper articles about heart disease included more death content than articles about other diseases. However, consistent with the previously discussed media trends of minimizing the threat of heart disease compared to other lower-risk diseases, articles about heart disease included significantly less death content than other diseases when compared to their respective mortality rates. Articles about diabetes were also found to include less death content than other diseases with significantly lower rates of mortality (Adelman and Verbrugge, 2000).

In addition to studies that have revealed the quantitative ways in which the threat posed by heart disease and diabetes may be minimized by news media, thereby minimizing public perception of the threat, some studies have uncovered qualitative characteristics of articles on these diseases that may also contribute to minimizing perceptions of threat. For example, a qualitative analysis of print media by Clarke (1992) found that cancer was generally portrayed as a fearsome threat whereas heart disease was portrayed as a highly preventable disease. Articles about heart disease tended to express a great deal of optimism regarding the preventability of the disease as well as its treatability due to new technological developments.

News media may also affect public perceptions of susceptibility to the disease, as well as perceptions of the severity of the disease. In a qualitative study, Rock (2005) examined how newspaper articles about diabetes framed the health risk. Among her findings was that articles which presented diabetes as a serious problem also associated the problem with a particular population, such as Native Americans, African Americans, Latin Americans, people over the age of 40, or young people. While the focus on a particular population may increase perceptions of susceptibility in those portrayed as being at greater risk, it allows others who do not fit the prescribed population attributes to perceive themselves to be at lower risk for the disease.

Although a review of the coverage of health risks may provide a larger picture of how news media may be minimizing the threat of some serious chronic diseases (such as heart disease and diabetes) in terms of the amount of coverage these diseases receive, it is also important to investigate how threat is communicated on the level of individual articles. The study by Clarke (1992) mentioned above suggests that news media may be

portraying heart disease as non-threatening and easily treatable. It is also important to discover if articles on heart disease and diabetes do a better job than cancer articles of including risk-reduction and efficacy messages. Based on the literature, it appears possible that news media coverage of cancer may often fail to include prevention information and efficacy messages (e.g., see Atkin, Smith, McFeters, and Ferguson, 2008; Berry, Wharf-Higgins, and Naylor, 2007; Freimuth, Greenberg, DeWitt, and Romano, 1984; Moriarty and Stryker, 2008; Stryker, Moriarty, and Jensen, 2005; Stryker, Solky, and Emmons, 2005), but coverage of heart disease, and perhaps diabetes, may very well fail to include sufficient threat as well as efficacy messages (Clark, 1992).

Message Design

A health risk message designed using the EPPM as a guide will include a threat component followed by an efficacy component. A review of the literature on message design provides an understanding of how threat (in terms of severity and susceptibility) and efficacy (in terms of response efficacy and self-efficacy) can be communicated through health risk messages. This also provides a guide for identifying threat and efficacy messages in newspaper articles on heart disease and type 2 diabetes.

Threat. Threat is the first component of a health risk message designed according to the EPPM. The threat component of a health risk message should emphasize the severity of the health risk and susceptibility to the health risk. The severity of the threat is perceived as the magnitude of harm expected from the threat. Susceptibility to the threat is perceived as the degree to which one feels at risk for experiencing the threat. There are a number of ways to present these two variables in health risk messages. Murray-Johnson and Witte (2003) stated that “messages often attempt to demonstrate the severity of threat

through statistics, graphics, personal testimonials, and intense and descriptive language” (p. 479). Susceptibility is often demonstrated through the use of statistics and probabilities, personal testimonials, linking behaviors with risk, emphasizing the long-term consequences of risky behaviors, and providing information about the risk status of peers.

Framing is a technique used in message design to emphasize the benefits of adopting the recommended behavior (gain frame) or the costs of not adopting it (loss frame) (Rothman, Bartels, Wlaschin, and Salovey, 2006; Rothman, Kelly, Hertel, and Salovey, 2003; Rothman and Salovey, 1997; Shen and Dillard, 2007). A fear appeal is a type of loss frame because it emphasizes the negative consequences of a health problem, which can contribute to the perception of the severity of a health problem (Rothman and Salovey, 1997).

Individuals use information about risk in health messages to make judgments about their own susceptibility to a health problem--i.e., whether it could happen to them (Rothman and Kiviniemi, 1999). However, people often have difficulty interpreting technical risk information in the form of probabilities and statistics (Covello, Winterfeldt, and Slovic, 1986; Holtgrave, Tinsley, and Kay, 1995; Rothman and Kiviniemi, 1999). Instead, they naturally tend to think of risk and probability in terms of words--such as high, low, very likely, or unlikely--rather than numbers (Bottorff, Ratner, Johnson, Lovato, and Joab, 1998; Rothman and Kiviniemi, 1999). Holtgrave, Tinsley, and Kay (1995) suggested using both words and numbers to express probability when communicating information about risk. This is also referred to as using both qualitative and quantitative expressions of probability or risk. The inclusion of both qualitative and

quantitative expressions of risk is likely to make it easier for people to recognize their susceptibility to the health threat.

The use of language that communicates directly with the recipient, such as the direct pronouns “you” and “your,” can increase attention and perceptions of susceptibility (Parrott, 1995). However, this direct language is not typically used in newspaper articles. Also, using specific terms such as “cardiologist” rather than categorical terms such as “physician” and avoiding the use of qualifiers such as “possibly,” “could,” and “might” can also increase perceptions of severity and susceptibility. Using descriptive, vivid, and intense language can increase perceptions of the severity of the threat (Murray-Johnson and Witte, 2003; Witte, 1992b). Hale and Dillard (1995) described vivid information as that which “provokes clear images and makes content seem physically, psychologically, and temporally close to the person who experiences the information” (p. 74). Message variables such as the use of vivid and intense language, as well as direct language, are often used to create differing levels of fear appeals (Witte, 1992b).

Descriptive and vivid language might also make it easier for people to imagine themselves experiencing a disease, which can enhance perceived susceptibility (Rothman and Kiviniemi, 1999). The ease with which people are able to imagine experiencing a disease can also be related to their ability to identify with an individual in a health risk message who has the disease. Research has found that perceiving oneself to be similar to the type of person who experiences a disease can increase perceived susceptibility (Gerend, Aiken, and West, 2004; Lek and Bishop, 1995; Rimal and Morrison, 2006). This may make it easier for people to imagine themselves in a similar situation, thereby increasing perceptions of their own susceptibility to the health threat.

The use of personal narratives in health risk messages has been found to be more effective in increasing perceptions of susceptibility than the use of statistics that demonstrate susceptibility (De Wit, Das, and Vet, 2008). A personal narrative or testimonial is a vivid presentation of risk and disease information. Statistics may be more successful in communicating the severity of a health risk, whereas susceptibility may be better communicated through the use of personal narrative.

The phrases used to describe risk can also affect perceptions of susceptibility. For example, Condit and Parrott (2004) found that within messages about heart disease and diabetes, people perceived risk to be higher when the messages used the phrase “a gene that causes.” Within discussions of diabetes, the use of the phrase “a gene for” also resulted in higher perceived risk. For both diseases, a lower risk was associated with the phrase “a family history of.”

Studies show that, across demographic differences, people naturally tend to minimize threats to their personal health by underestimating their own susceptibility to health risks while perceiving others to be at greater risk (Weinstein, 1982, 1983, 1984). This optimistic bias has been found to be even stronger for diseases perceived as life-threatening, such as heart disease and diabetes (Lek and Bishop, 1995; Weinstein, 1982, 1983). A component of the optimistic bias is the tendency of people to perceive themselves as being dissimilar to high-risk people (Gump and Kulik, 1995; Lek and Bishop, 1995; Rimal and Morrison, 2006). Logically, therefore, perceiving oneself to be similar to the type of person who experiences a disease or to a group at high risk for a disease can increase feelings of susceptibility (Gerend, Aiken, and West, 2004; Lek and Bishop, 1995; Rimal and Morrison, 2006). In particular, sharing demographic

characteristics with people who have or are at high risk for a disease can have a stronger effect on susceptibility than sharing values or behaviors (Rimal and Morrison, 2006). In order to overcome people's natural tendency to maintain their beliefs of invulnerability, Lek and Bishop (1995) suggest effective health risk messages should include information that debunks stereotypes of the type of people who get a disease. Therefore, those who perceive themselves to be outside of stereotypical high-risk groups will not so easily be able to deny their own susceptibility.

Efficacy. The efficacy component of a health risk message that follows the EPPM should foster strong beliefs in the effectiveness of the recommended response (response efficacy) and in the individual's ability to perform the recommended response (self-efficacy). If an individual perceives response and self-efficacy to be high, he or she is motivated to control the danger. This means he or she is likely to take action to avert the threat. Efficacy, therefore, determines whether the response to the health risk message is acceptance or rejection. There are multiple ways in which health risk messages can develop efficacy in individuals.

According to Maibach and Murphy (1995), "health promotion interventions that enhance self-efficacy, in turn, foster (the) health behavior itself" (p. 37). Bandura (1977) argued that self-efficacy has greater weight in determining behavior than response efficacy. Indeed, studies have frequently found self-efficacy to be more predictive of behavior than response efficacy, although response efficacy is still important (Beck and Frankel, 1981; Beck and Lund, 1981; Dabbs and Leventhal, 1966; Desharnais, Bouillon, and Godin, 1986; Maddux and Rogers, 1983; van Empelen, Schaalma, Kok, and Jansen, 2001; Zak-Place and Stern, 2004). If people feel confident in being able to carry out the

recommended action to reduce the threat, they are more likely to be successful, even if there is some doubt about the efficacy of the recommended response.

It is important to note the distinction between mobilizing information and efficacy messages. Mobilizing information usually cues the reader to take multiple actions to learn more about a topic, for example, by visiting a Web site or calling a toll-free number. In contrast, efficacy messages provide readers with the information they need to perform the behavior immediately, without necessarily requiring the reader to take additional steps (Moriarty and Stryker, 2008). Moriarty and Stryker stated that “efficacy messages convey specific information about learning a health skill or modeling of the behavior” (p. 489). However, Murray-Johnson and Witte (2003) argued that in order to effectively encourage self-efficacy, a message must not only include information about how to carry out the recommended behavior, but it must also make it seem as if this behavior can be successfully performed by the individual.

A number of sources can affect self-efficacy. Bandura (1977) described four sources of efficacy development or information: 1) personal experience; 2) vicarious experience; 3) verbal persuasion; and 4) one’s physiological and emotional state. Health risk messages in news media are most likely to encourage self-efficacy in readers through vicarious experience and verbal persuasion. For example, a reader could have a vicarious experience by reading a description of how a person has successfully adopted a regular exercise program despite the challenges of work and family. A writer can attempt to verbally persuade the reader in an article that he or she can also successfully adopt a regular exercise program.

Judgments about self-efficacy are contextual. A person can experience a high level of self-efficacy in carrying out one particular behavior, but this self-efficacy does not necessarily transfer to other behaviors (Bandura, 1977; Maibach and Murphy, 1995; Stretcher, DeVellis, Becker, and Rosenstock, 1986). Therefore, people will have different beliefs about their self-efficacy for different behaviors. In the context of engaging in behaviors to reduce the risk of heart disease and diabetes, for example, people may have different feelings of self-efficacy regarding their ability to engage in regular physical activity and their ability to eat a healthier diet. Therefore, each behavior a health risk communication recommends must have its own self-efficacy message.

An important component of efficacy messages is the identification or anticipation of barriers to carrying out the recommended behavior. If a message anticipates and refutes barriers, it will be more likely to have a positive influence on behavior (Hale and Dillard, 1995; Murray-Johnson and Witte, 2003). Higher perceived barriers (tasks perceived to be very difficult) have been found to be correlated with lower self-efficacy among individuals with type 2 diabetes (Aljasem, Peyrot, Wissow, Rubin, 2001). Barriers to self-efficacy can be internal, such as psychologically-based barriers, or external, such as environmentally-based barriers (Maibach and Murphy, 1995). Barriers also vary depending on the population (Maibach and Murphy, 1995).

The use of two-sided refutational messages in health risk messages can be a way of anticipating barriers and increasing self-efficacy (Hale and Dillard, 1995). A two-sided refutational message presents the main message argument and refutes opposing arguments. A meta-analysis by Allen (1991) found that two-sided messages that refuted opposing arguments were more persuasive than one-sided messages and two-sided

messages that did not refute opposing arguments. Two-sided refutational messages could be used as part of health risk messages to address and refute potential barriers to performing the prescribed behavior. This could help people feel prepared to face these barriers and overcome them, thus increasing self-efficacy.

Summary

News media coverage of health risks often does not correlate to the magnitude of the risk. News media may underemphasize the threat of heart disease and diabetes while overemphasizing the threat of lower-mortality diseases. Heart disease, however, is the leading cause of death in the U.S., and the prevalence of type 2 diabetes (a risk factor for heart disease) is increasing significantly in the U.S. along with the rise in obesity. Heart disease and type 2 diabetes pose significant health threats; yet, the public may not perceive them as being as threatening as cancer and other lower mortality diseases which have a greater presence in news media coverage. It is therefore especially important to investigate the presence of threat and efficacy messages in newspaper articles about heart disease and type 2 diabetes. There is a question as to whether news media are imparting sufficient perceptions of threat and efficacy at the level of individual articles.

This paper presents a content analysis using the EPPM to determine the extent to which newspaper articles about heart disease and type 2 diabetes contain the message components necessary to motivate risk-reducing behaviors. The EPPM provides a useful framework for analyzing how effective health risk messages may be in encouraging risk-reducing behavior and achieving healthier outcomes, and the message design literature reveals techniques for communicating threat and efficacy in health risk messages. This study applies these concepts to investigate the following research questions:

RQ1: What percent of newspaper articles about heart disease and type 2 diabetes contain all four components of the EPPM (severity, susceptibility, response efficacy, and self-efficacy)?

RQ2: What percent of newspaper articles are missing one or more of the threat components (severity and susceptibility)?

RQ3: What percent of newspaper articles are missing one or more of the efficacy components (response efficacy and self-efficacy)?

RQ4: Is there a difference between articles about heart disease and articles about type 2 diabetes in percentages of EPPM components?

RQ5: Are heart disease and type 2 diabetes framed differently in terms of message techniques?

Method

I performed a content analysis on newspaper articles about the prevention of heart disease and type 2 diabetes through individual lifestyle changes, including weight control, diet, physical activity, and smoking cessation. The newspapers included in the analysis were the top three circulating newspapers in the U.S.: *USA Today*, *The Wall Street Journal*, and *The New York Times* (Audit Bureau of Circulations, 2008). These newspapers are nationally influential and, as such, are often a source of news stories and ideas for smaller, local newspapers (Project for Excellence in Journalism, 2006) and other news media sources (Klaidman, 1990).

Sample Selection

To create the sample, I used the LexisNexis Academic and ProQuest Newspapers databases to search articles in *USA Today*, *The Wall Street Journal*, and *The New York Times* that were published between January 1, 2006 and December 31, 2007. I used the terms “heart disease,” “coronary artery disease,” and “diabetes” to search the text of articles in the three newspapers. I culled the initial sample by eliminating obituaries, letters to the editor, op-ed pieces, book reviews, articles that appeared in the online edition only, and articles that appeared in the newspaper’s companion magazine. I further refined the sample by eliminating articles that did not include information about heart disease or type 2 diabetes prevention and behavior-related risk factors. The articles eliminated in this round focused on: type 1 diabetes (which is not preventable through lifestyle changes), another disease, treatment, diagnosis, drug-related prevention, regional incidence, non-behavior-related risk factors (e.g., depression, PTSD, air pollution), topics for which heart disease was only mentioned peripherally, and the biology of disease. I

also eliminated articles aimed at clinicians (only a couple). The final sample consisted of 204 articles.

Timeframe

I chose the 2006 through 2007 timeframe for the sample in order to provide a comparison between a year of heavy coverage due to a trigger event and a year of normative coverage. Applying the same elimination criteria to articles in both years yielded 143 articles in 2006 and 61 articles in 2007. Beginning January 1, 2006, federal rules went into effect that required manufacturers to include trans fat information on their products' nutrition labels. The consumption of trans fats has been linked to heart disease and type 2 diabetes. Trans fats then became a common theme in heart disease and diabetes prevention coverage throughout 2006. In June of that year, Kentucky Fried Chicken was sued for its use of trans fats. In July, the city of Chicago considered banning trans fats. In September, New York proposed a city-wide ban on trans fats, which the city then passed in December 2006.

Coding Variables

I created a codebook to identify messages in newspaper articles based on the four components of the EPPM: severity, susceptibility, response efficacy, and self-efficacy (see Appendix). I coded only messages related to heart disease and diabetes prevention through individual lifestyle changes including weight control, diet, physical activity, and smoking.

An early version of the codebook included message counts for each of the severity, susceptibility, response efficacy, and self-efficacy variables. However, during the coder training process I determined that message counts would not allow for a high

enough level of inter-coder reliability, so I changed the codebook to include only Yes/No responses.

Disease and prevention focus. I coded articles by whether they focused on heart disease, diabetes, or equally addressed both diseases. I coded the prevention focus of the article as obesity/weight control, diet, physical activity, smoking, or general lifestyle (mentioned several lifestyle changes, but did not focus on one).

Threat messages. I coded the presence of severity messages, as well as the characteristics of these messages. To describe severity messages, I coded articles as using a number or statistic to convey the severity of the disease (e.g., number of annual deaths), as mentioning any of the negative consequences of the disease (e.g., death, heart attack, amputation, blindness, disability), as using intense or vivid language to describe the harm or consequences of the disease (e.g., any particularly descriptive or vivid passages, including the use of descriptive adjectives such as “grim,” “grueling,” and “devastating”), and as using a testimonial or personal narrative to convey the negative impact of the disease in one’s life. I coded messages that undermined the severity of the disease as minimizing messages. These were messages that discussed the decline in the number of deaths from the disease or its complications and emphasized the treatability of the disease due to advances in medicine and technology.

If present, I coded susceptibility messages as using a number, statistic, or probability (to identify people at risk for the disease or the prevalence of the disease); as identifying risk factors for the disease; and as using a personal narrative, testimonial, or profile to convey susceptibility. I also coded groups identified in the article as being at

particular risk for the disease, including whether the article focused on race or ethnic origin, gender, age, or obesity.

Efficacy messages. I coded recommended responses only if they were explicit. If recommended responses included an efficacy message, I also coded them as response efficacy messages.

If present, I coded self-efficacy messages as messages that: bolstered the self (e.g., told readers they were capable of performing the behavior); attempted to verbally persuade the reader to carry out the behavior; provided more than three steps, behaviors, or tips for carrying out the behavior; or demonstrated that the recommended behavior is easily accomplished by discussing others who had carried it out (role modeling). I also coded the mention of barriers to carrying out the behavior and whether the article refuted the barriers.

I also added a variable to determine whether the article presented threat and efficacy messages in the correct order. According to the EPPM, threat should appear before efficacy.

Trigger. Two variables identified whether the article may have been related to the trigger. These variables included whether the article mentioned trans fat or fast food.

Inter-coder Reliability

I trained a second coder in the theoretical concepts of the EPPM, how they apply to message design, and how I incorporated these concepts into the codebook. We practiced coding articles outside the sample used for this study. After the practice sessions, we independently coded 10% of the final sample of articles. I randomly selected this subsample using an online random number generator that generates numbers based

on an algorithm (www.randomizer.org). To test the validity of the coding scheme, I conducted an inter-coder reliability test on the independently-coded subsample using Cohen's κ (kappa). We discussed all disagreements in the coding of variables and I revised the codebook accordingly. I then gave the second coder additional training. To test the revised codebook, we independently coded a second unique random sample and performed a second inter-coder reliability test using Cohen's κ . This time, reliability ranged from 0.77 to 1.0 for each variable, with an average of 0.9. A value of 0.75 and above is generally accepted as a sufficiently high level of agreement (Landis and Koch, 1977; Orwin, 1994).

Data Analysis

In addition to generating percentages to analyze data, I performed chi-square (χ^2) calculations to determine whether there were statistically significant associations between article groups and a number of variables. Statistical significance was set at $p < .05$. For calculations involving small samples, I used Fisher's exact test to confirm significance. I also tested for correlations between message variables. Although I conducted multiple significance tests in this study, I did not perform numerous tests on the same data set. Therefore, there is minimal concern of the occurrence of a Type 1 error.

I performed chi-square and correlation tests using a downloadable statistical software program called GraphPad InStat, Version 3 (www.graphpad.com). I also ran the data for several calculations on Statistical Analysis Software (SAS), Version 9.1 to confirm that the results from the free, downloadable software were accurate. I calculated Fisher's exact test using a form publicly available on the web (<http://www.physics.csbsju.edu/stats/>).

Results

The majority of newspaper articles, 47%, were about heart disease (n = 95), 21% were about type 2 diabetes (n = 42), and 33% of articles equally addressed both diseases (n = 67). In terms of the prevention efforts emphasized in articles, 33% focused on obesity or weight loss (n = 67), 33% focused on diet (n = 67), 9% focused on physical activity (n = 18), 5% focused on smoking (n = 10), and 21% emphasized a variety of lifestyle changes (n = 42).

The first research question asked about the percent of newspaper articles that contained all four components of the EPPM. Newspaper articles on heart disease and diabetes prevention rarely contained all four types of messages. Only 10% of articles (n = 21) included severity, susceptibility, response efficacy, and self-efficacy messages. When analyzed by subject--heart disease, diabetes, and articles that equally addressed both diseases--the percent of articles that included all four EPPM components was similarly low across groups (see Table 1). Among articles about heart disease, 12% contained all four types of messages. Similarly, 12% of diabetes articles included all four messages. However, only 7% of articles that equally discussed both diseases included all four messages.

Table 1

Articles by Subject with Four EPPM Components

Overall (n = 204)	Heart disease (n = 95)	Diabetes (n = 42)	Both (n = 67)
10% (n = 21)	12% (n = 11)	12% (n = 5)	7% (n = 5)

As shown in Table 2, when I analyzed articles by prevention focus, they revealed somewhat more variation. All four EPPM messages were present in 7% of articles about weight and weight loss and 9% of articles about diet. None of the articles about smoking included all four message types. However, a greater percentage (17%) of articles about physical activity and articles promoting overall lifestyle changes included all four EPPM messages.

Table 2

Articles by Primary Prevention Focus with Four EPPM Components

Weight/weight loss (n = 67)	Diet (n = 67)	Physical activity (n = 18)	Smoking (n = 10)	General lifestyle (n = 42)
7% (n = 5)	9% (n = 6)	17% (n = 3)	0% (n = 0)	17% (n = 7)

The second research question asked about the percent of newspaper articles missing one or more of the threat components (see the first column in Table 3). More than half (55%) of articles were missing a severity message, a susceptibility message, or both types of messages. Slightly less than half (48%) were missing a severity message. Susceptibility messages were more common, with only 15% missing this type of message. Only 7% had absolutely no threat component (i.e., neither a severity nor a susceptibility message).

The third research question asked about the percent of newspaper articles missing one or more of the efficacy components (see the first column in Table 4). Almost three-quarters (73%) of articles were missing a response efficacy message, a self-efficacy message, or both. Response efficacy messages were more likely to be present in articles than self-efficacy messages. Response efficacy messages were missing in 42% of articles,

whereas self-efficacy messages were missing in 66% of articles. In addition, 34% of articles did not include any efficacy messages.

The EPPM requires threat messages to appear in a communication piece before efficacy messages in order to have the desired effect on behavior. Therefore, this study also coded for the order in which threat and efficacy messages appeared in articles. Of the articles that included at least one threat message and at least one efficacy message, only 28% presented messages in the correct order (threat before efficacy) and 38% presented messages out of order. The remaining 40% of articles were missing either both threat or both efficacy messages so the order was not relevant.

The fourth research question asked whether there is a difference between articles about heart disease and articles about type 2 diabetes in the percentages of EPPM components. The coding revealed a third type of article that addressed both diseases equally. As mentioned above and shown in Table 1, a smaller percentage of articles (7%) in this third group that addressed both diseases included all four components of the EPPM, compared with 12% of heart disease articles and 12% of diabetes articles.

Table 3 compares the percentages of articles missing threat messages across the three groups. There were significant differences between article groups in whether they were missing one or more threat components ($\chi^2 = 9.5, p < .01$). Articles that addressed both diseases were more likely to be missing one or more threat components (70%) than articles that focused on either heart disease (46%) or diabetes (50%). There were also significant differences between article groups in whether they included a severity message ($\chi^2 = 7.9, p < .02$). Articles that addressed both diseases tended to lack a severity message more often (61%) than articles about heart disease (39%) or diabetes (45%).

Table 3

Absence of Threat Messages in Articles

	Overall (n = 204)	Heart disease (n = 95)	Diabetes (n = 42)	Both (n = 67)	χ^2
Missing one or more threat components	55% (n = 112)	46% (n = 44)	50% (n = 21)	70% (n = 47)	9.5, p < .01
No threat components	7% (n = 15)	11% (n = 10)	0% (n = 0)	7% (n = 5)	4.7, p = .09*
No severity messages	48% (n = 97)	39% (n = 37)	45% (n = 19)	61% (n = 41)	7.9, p < .02
No susceptibility messages	15% (n = 30)	18% (n = 17)	5% (n = 2)	16% (n = 11)	4.2, p = .12

Note: Chi-square (χ^2) values were calculated for each row to determine if there were significant differences between articles on heart disease, diabetes, and articles that equally addressed both diseases.

*Using Fisher's exact test, which is more accurate than the chi-square test when the values are small, p = .07.

As shown in Table 4, high percentages of articles in all three groups were missing one or more efficacy components. Among articles about heart disease, 78% fell in this category, as well as 79% of diabetes articles and 63% of articles that addressed both diseases. Across the three groups of articles, the percentages with no efficacy components were fairly similar, as were the percentages missing a response efficacy message. However, there were significant differences between article groups in whether they included a self-efficacy message ($\chi^2 = 9.9$, p < .01). Approximately half (51%) of articles about both diseases were missing a self-efficacy message, compared to 74% of heart disease articles and 71% of diabetes articles.

Table 4

Absence of Efficacy Messages in Articles

	Overall (n = 204)	Heart disease (n = 95)	Diabetes (n = 42)	Both (n = 67)	χ^2
Missing one or more efficacy components	73% (n = 149)	78% (n = 74)	79% (n = 33)	63% (n = 42)	5.4, p = .07
No efficacy components	34% (n = 70)	39% (n = 37)	24% (n = 10)	34% (n = 23)	3.0, p = .22
No response efficacy messages	42% (n = 85)	43% (n = 41)	31% (n = 13)	46% (n = 31)	2.7, p = .27
No self-efficacy messages	66% (n = 134)	74% (n = 70)	71% (n = 30)	51% (n = 34)	9.9, p < .01

Note: Chi-square (χ^2) values were calculated for each row to determine if there were significant differences between articles on heart disease, diabetes, and articles that equally addressed both diseases.

Overall, approximately half of heart disease articles and diabetes articles were missing one or more threat components, but nearly 80% of articles in these two groups were missing one or more efficacy messages. Together, heart disease articles and diabetes articles made up 67% of the total sample. The remaining 33% of the sample consisted of articles that equally addressed both diseases. These articles followed an opposite trend. They were more likely to contain efficacy messages than threat messages. They tended to include fewer severity messages and more self-efficacy messages.

The fifth and final research question asked if heart disease and type 2 diabetes are framed differently in terms of the message techniques used to convey threat and efficacy. Once again, I coded message characteristics separately for heart disease articles, diabetes

articles, and articles that addressed both diseases. Table 5 shows the differences in how the three article categories presented severity messages.

Table 5

Characteristics of Severity Messages in Articles

	Heart disease (n = 95)	Diabetes (n = 42)	Both (n = 67)	χ^2
Number or statistic	19% (n = 18)	10% (n = 4)	7% (n = 5)	5.1, p = .08
Description of negative consequences	60% (n = 57)	55% (n = 23)	39% (n = 26)	7.2, p < .03
Intense, vivid, or descriptive language	5% (n = 5)	12% (n = 5)	1% (n = 1)	5.5, p = .06*
Testimonial or personal narrative	2% (n = 2)	17% (n = 7)	0% (n = 0)	19.2, p < .0001**
Message(s) that minimized severity	5% (n = 5)	5% (n = 2)	3% (n = 2)	0.5, p = .78***

Note: Chi-square (χ^2) values were calculated for each row to determine if there were significant differences between articles on heart disease, diabetes, and articles that equally addressed both diseases.

*Using Fisher's exact test, which is more accurate than the chi-square test when the values are small, p = .06.

**Using Fisher's exact test, p < .0001.

***Using Fisher's exact test, p = .83

The two framing characteristics of severity messages that appear to have the greatest percent differences across article groups are the inclusion of a description of the negative consequences of the disease and the use of a testimonial or personal narrative to convey the severity of the disease. There were significant differences between article

groups in their mention of the negative consequences of the disease ($\chi^2 = 7.2, p < .03$). Among articles that addressed both diseases, only 39% included a description of the negative consequences, compared to 60% of heart disease articles and 55% of diabetes articles. Recall that articles that addressed both diseases were less likely to include a severity message than the other two groups. In fact, as shown in Table 5, articles that addressed both diseases had smaller percentages for each type of severity message characteristic than the other two article groups.

However, diabetes articles were more likely to include a testimonial or personal narrative to convey severity. Only 2% of heart disease articles and no articles that addressed both diseases included a testimonial or personal narrative to convey severity, compared to 17% of diabetes articles. There were significant differences between article groups for this message characteristic ($\chi^2 = 19.2, p < .0001$). The association remained significant with Fisher's exact test ($p < .0001$).

There is significantly more variation across article groups in how susceptibility messages were presented (see Table 6). The only characteristic in which the groups appeared to be similar was in the mention of risk factors to communicate susceptibility to a disease. Approximately 80% to 90% of articles in each group mentioned risk factors that increased susceptibility to heart disease or diabetes.

For the use of a number or statistic to convey susceptibility, there was a significant difference across the three article groups ($\chi^2 = 15.4, p < .001$). Among diabetes articles, 67% included a number or statistic, compared with 32% of heart disease articles and 49% of articles that addressed both diseases. There was also a significant difference in the use of a personal narrative, testimonial, or profile to convey

susceptibility ($\chi^2 = 17.5, p < .001$). Only 7% of heart disease articles and 10% of articles that addressed both diseases used this message technique, compared to 33% of diabetes articles.

Table 6

Characteristics of Susceptibility Messages in Articles

	Heart disease (n = 95)	Diabetes (n = 42)	Both (n = 67)	χ^2
Number or statistic	32% (n = 30)	67% (n = 28)	49% (n = 33)	15.4, p < .001
Risk factors	81% (n = 77)	90% (n = 38)	84% (n = 56)	1.9, p = .38
Personal narrative, testimonial, or profile	7% (n = 7)	33% (n = 14)	10% (n = 7)	17.5, p < .001
Focused on or singled out groups	28% (n = 27)	74% (n = 31)	60% (n = 40)	29.5, p < .0001
Focused on or singled out race/ethnic origin	1% (n = 1)	29% (n = 12)	10% (n = 7)	25, p < .0001
Focused on or singled out gender	12% (n = 11)	7% (n = 3)	4% (n = 3)	2.7, p = .26
Focused on or singled out age	8% (n = 8)	33% (n = 14)	36% (n = 24)	20.4, p < .0001
Focused on or singled out obesity	16% (n = 15)	50% (n = 21)	33% (n = 22)	17.5, p = .0001

Note: Chi-square (χ^2) values were calculated for each row to determine if there were significant differences between articles on heart disease, diabetes, and articles that equally addressed both diseases.

Conveying susceptibility by focusing on or singling out a particular group as being at high risk was used more often in articles about diabetes (74%) and articles that

addressed both diseases (60%) than articles about heart disease (28%). There were significant differences between article groups in the use of this technique ($\chi^2 = 29.5$, $p < .0001$). Of the four groups identified in the coding of articles as increasing susceptibility to disease--race or ethnic origin, gender, age, and obesity--heart disease articles had the lowest percentages for all groups except gender.

There were significant differences between articles in the identification of race or ethnicity as putting individuals at high risk for disease ($\chi^2 = 25$, $p < .0001$). Almost 30% of diabetes articles identified race or ethnicity in terms of susceptibility to the disease, compared to 1% of heart disease articles and 10% of articles that addressed both diseases. There were also significant differences between article groups in whether they emphasized age ($\chi^2 = 20.4$, $p < .0001$) and obesity ($\chi^2 = 17.5$, $p = .0001$) as increasing susceptibility. The articles that addressed both diseases were more likely to emphasize age (36%), compared to 33% of diabetes articles and only 8% of heart disease articles. Half of diabetes articles emphasized obesity (rather than being overweight) as increasing susceptibility to the disease, compared to 33% of articles that addressed both diseases and 16% of articles about heart disease.

Continuing to address the fifth research question about message techniques, Tables 7 and 8 show the characteristics of efficacy messages in articles. Table 7 shows the differences between article groups in how often they explicitly promoted a recommended behavior or response and whether it was accompanied by a response efficacy message. Although the differences between groups for these variables were minimal, a substantial percentage of articles in each group (29% to 34%) did not include explicit recommended responses.

Table 7

Characteristics of Response Efficacy Messages in Articles

	Heart disease (n = 95)	Diabetes (n = 42)	Both (n = 67)
Explicitly promoted responses	66% (n = 63)	71% (n = 30)	67% (n = 45)
Recommended responses without response efficacy message	18% (n = 17)	12% (n = 5)	27% (n = 18)

Since the percentages of articles in each group that included self-efficacy messages tended to be relatively low, the percentages of articles that employed each type of self-efficacy message technique were also fairly low (see Table 8). However, there were significant differences between article groups in the inclusion of more than three steps, behaviors, or tips for carrying out the recommended response ($\chi^2 = 6.2, p < .05$). Articles about both diseases tended to include more information about carrying out the behavior (37%) than articles about heart disease (22%) or articles about diabetes (19%). There was also a significant difference between groups as to whether they included examples of role modeling to promote self-efficacy ($\chi^2 = 6.9, p < .04$). Only 7% of articles about heart disease included role modeling, compared to 21% of articles about diabetes and 19% of articles that addressed both diseases.

Few articles in any group included self-efficacy messages that attempted to psychologically encourage the reader by promoting the capability of the self. Only 13% of articles that addressed both diseases, 10% of diabetes articles, and 2% of heart disease articles used this technique. However, there were significant differences between article

groups in the use of this technique ($\chi^2 = 7.8, p < .03$). The association remained significant with Fisher's exact test ($p = .01$).

Table 8

Characteristics of Self-Efficacy Messages in Articles

	Heart disease (n = 95)	Diabetes (n = 42)	Both (n = 67)	χ^2
Promoted the capability of the self	2% (n = 2)	10% (n = 4)	13% (n = 9)	7.8, $p < .03^*$
Attempted to persuade reader to carry out behavior	1% (n = 1)	0% (n = 0)	0% (n = 0)	1.2, $p = .56^{**}$
Included more than 3 steps, behaviors, or tips for carrying out behavior	22% (n = 21)	19% (n = 8)	37% (n = 25)	6.2, $p < .05$
Described other(s) who has carried out behavior (role modeling)	7% (n = 7)	21% (n = 9)	19% (n = 13)	6.9, $p < .04$
Mention barrier(s) to carrying out behavior	37% (n = 35)	55% (n = 23)	51% (n = 34)	5.1, $p = .08$
Mention and refute barrier(s)	18% (n = 17)	36% (n = 15)	25% (n = 17)	5.2, $p = .08$
Mention and do not refute barrier(s)	19% (n = 18)	19% (n = 8)	25% (n = 17)	1.1, $p = .58$

Note: Chi-square (χ^2) values were calculated for each row to determine if there were significant differences between articles on heart disease, diabetes, and articles that equally addressed both diseases.

*Using Fisher's exact test, which is more accurate than the chi-square test when the values are small, $p = .01$.

**Using Fisher's exact test, $p = 1.0$.

Even fewer articles attempted to persuade the reader to carry out the recommended behavior. However, a substantial percentage of articles in each group mentioned one or more barriers to carrying out the recommended behavior (37% of heart disease articles, 55% of diabetes articles, and 51% of articles that addressed both diseases). Among articles about heart disease and articles that addressed both diseases which mentioned a barrier, approximately half (50%) also refuted the barrier, while the other half did not. Articles about diabetes that mentioned a barrier to carrying out the recommended behavior were more likely to refute the barrier (65%) than leave it unrefuted (35%).

Tests to determine if correlations existed between message variables revealed very little that was significant. There were no significant correlations across variables (e.g., between the use of personal narratives to convey susceptibility and the inclusion of role modeling to promote self-efficacy). The only significant correlation ($r = .9999$, $p = .01$) was between the use of a number or statistic to convey severity and a description of negative consequences of the disease--techniques often used together to increase perceptions of severity.

I also coded articles if they discussed trans fat and fast food in order to determine if they might be related to the trigger identified at the beginning of 2006. The trigger resulted in an increased coverage of trans fat and fast food in 2006. Approximately three-quarters (73%) of the articles that mentioned trans fat, fast food, or both appeared in 2006. Moreover, articles that mentioned trans fat, fast food, or both made up 30% of articles in 2006. The percentages of trans fat and fast food articles missing threat components did not vary greatly from the percentages for the overall sample. However,

there were significant differences between the trans fat and fast food articles and the overall sample in the number of articles with no efficacy components ($\chi^2 = 4.6, p < .05$) and the number of articles with no response efficacy messages ($\chi^2 = 5.3, p < .05$). Exactly half (50%) of the articles about trans fat, fast food, or both had no efficacy components, compared to 34% of the overall sample. In addition, 59% of the trans fat and fast food articles had no response efficacy messages, compared to 42% of the overall sample.

Discussion

The purpose of this study was to apply the EPPM, a model of behavior change, to newspaper articles about the prevention of heart disease and type 2 diabetes to determine whether these articles contained the messages necessary to motivate risk-reducing behavior. Since newspapers remain an important source of health information to the public, it is important to learn how they may be shaping public perceptions regarding health and disease.

As mentioned previously, there are four components to the EPPM, which are required for positive behavior change (Witte, 1992). The two threat components are severity and susceptibility and the two efficacy components are response efficacy and self-efficacy. According to the EPPM, if one or more threat components are missing in an article about heart disease or diabetes, the reader may not perceive a sufficient level of threat and is therefore unlikely to proceed with an evaluation of the efficacy components. If this occurs, the article will be unlikely to provoke a response in the reader. If the article does contain threat messages and the reader perceives a sufficient level of threat, he or she is likely to continue with an evaluation of the efficacy components. If one or more efficacy components are missing in the article, the reader may be left with a perception of the threat, but feel that nothing can be done about it. The reader may therefore respond by denying the threat, rejecting the message, or reacting against the message. However, if the article does contain efficacy messages, and the reader perceives a sufficient level of efficacy, the article is more likely to motivate the reader to engage in the recommended risk-reducing behavior.

The results reveal that the vast majority of newspaper articles are likely failing to motivate risk-reducing behaviors. They simply do not have the threat and efficacy messages necessary to provoke people to take preventive action against heart disease and type 2 diabetes. Only 10% of articles about heart disease and diabetes prevention included all four EPPM components. More than half (55%) of the articles may not even lead the reader to perceive a threat--the first step in the evaluation process--because they were missing one or more threat components. This means that a considerable portion of articles may not be doing anything to foster the perception in readers that heart disease and type 2 diabetes are serious diseases to which they may be susceptible. This is a major concern considering that heart disease is the leading cause of death in this country and diabetes, the sixth leading cause of death, which also raises one's risk of heart disease, has been substantially increasing due to climbing rates of overweight and obese adults and children. Fortunately, individuals can take considerable action to prevent both diseases. However, they must first perceive the diseases to be threats, which may not be accomplished by the majority of newspaper articles.

If a reader does perceive the threat of these diseases, the majority of articles would not then develop sufficient perceptions of efficacy necessary to result in the reader carrying out the response recommended in the article. Approximately three-quarters (73%) of the articles were missing one or more efficacy components and one-third (34%) of the articles had no efficacy components. This substantiates Witte's (1994) criticism that health messages are often missing the efficacy component. Furthermore, over one-third (35%) of articles in this study include the two threat components, but only one or none of the efficacy components. These are the articles that can have potentially

dangerous effects. If people perceive a threat but do not feel they can do anything to avert it, they may end up defensively avoiding the message, denying the threat, or reacting against the message, and may not be receptive to future information about the threat (Witte, 1992b; Witte and Allen, 2000). As a result, future attempts to communicate the threat of heart disease and diabetes may be completely ineffective.

The literature revealed that self-efficacy may be a greater determinant of whether an individual will engage in a recommended behavior than response efficacy (e.g., see Bandura, 1977; Beck and Frankel, 1981; Beck and Lund, 1981; Dabbs and Leventhal, 1966; Desharnais, Bouillon, and Godin, 1986; Maddux and Rogers, 1983; van Empelen, Schaalma, Kok, and Jansen, 2001; Zak-Place and Stern, 2004). However, the majority (66%) of articles about heart disease and diabetes did not include messages promoting self-efficacy. This parallels previous research that found self-efficacy messages to be missing in the majority of newspaper articles on cancer prevention and detection (Moriarty and Stryker, 2008).

Interestingly, diabetes articles were particularly strong in communicating susceptibility. In the comparison of message techniques used by the three article groups, articles about diabetes had the highest percentages of susceptibility messages that employed each technique. It is likely that if the number of messages in articles had been counted, diabetes articles would have had the greatest number of susceptibility messages or the highest ratio of susceptibility messages to articles. Of the three article groups, diabetes articles were the most likely to: include a number or statistic to express the prevalence of the disease or its risk factors; mention risk factors; include a personal

narrative, testimonial, or profile of someone with the disease or at risk for the disease; and focus on or single out particular groups or populations as being at risk for the disease.

The strong presence of susceptibility messages and the use of a variety of techniques to convey susceptibility in articles about diabetes is hopeful in terms of fostering perceptions about susceptibility to this disease in readers. However, in the statistical analysis conducted for this study, heart disease articles were significantly less likely than diabetes articles to use each technique for conveying susceptibility, except for the mention of risk factors. This is troubling in light of the fact that heart disease kills approximately nine times more people each year than diabetes (Kung, Hoyert, Xu, and Murphy, 2007). Clearly, more can and should be done to communicate susceptibility to heart disease in newspaper articles.

Approximately three-quarters (74%) of articles about diabetes singled out a group as being at particular risk for the disease. This echoes a qualitative analysis by Rock (2005), which found that newspaper articles about diabetes often associated the disease with a particular population based on race, ethnicity, or age. The tendency of diabetes articles to associate the disease with a particular group or population may result in increased perceptions of susceptibility among those who identify as belonging to that group, whether based on their race or ethnicity, gender, age, being obese, or another characteristic. Focusing on a population in an article may help to overcome the protective optimistic bias that people tend to invoke in the face of health threats. This is the tendency to see oneself as being unlike those who are at risk, effectively allowing people to deny their own susceptibility (Gump and Kulik, 1995; Lek and Bishop, 1995; Rimal and Morrison, 2006). Instead, as research has suggested, readers may be forced to face

their own susceptibility because they share characteristics with those identified in the article as being susceptible (Gerend, Aiken, and West, 2004; Lek and Bishop, 1995; Rimal and Morrison, 2006).

The disadvantage of singling out a particular group as being susceptible is that it gives those who do not identify as part of that group an opportunity to excuse themselves from developing any perceptions of susceptibility and to conclude that the threat does not apply to them. Certainly, there are particular groups of people who are at higher risk for type 2 diabetes, but there are also risk factors that span across all groups, namely being overweight or obese (which defines two-thirds of U.S. adults) and being physically inactive (CDC, 2007; NIDDK, 2006). In fact, age has long been identified as a risk factor for type 2 diabetes, and the disease is most prevalent among those 60 and older (CDC, 2005). However, the incidence of type 2 diabetes has been increasing in younger age groups, including children and adolescents, in large part because of an increase in the number of overweight and obese young people (Bloomgarden, 2004; CDC, 2007). Being obese is identified in half (50%) of the articles about diabetes as increasing susceptibility to the disease, but being overweight also increases one's susceptibility to diabetes. If articles single out obesity as the culprit, those who are overweight may not consider themselves to be at risk.

When groups are singled out in a health risk message, the susceptibility message may get through to those identified, but others may end up succumbing to the optimistic bias and disavowing their own susceptibility. This is not a particularly desirable result when, in fact, those who are susceptible constitute a much larger group than that identified in the article. This is likely why Lek and Bishop (1995) suggested that effective

health risk messages debunk stereotypes of those who are at risk. This advice might be particularly applicable to a disease like diabetes that largely stems from modifiable risk factors that affect a broad range of populations.

How can health professionals help journalists provide more effective disease prevention information to the public?

This study's analysis of the techniques used in threat and efficacy messages provides a starting point for identifying what types of messages could be increased in articles about heart disease and type 2 diabetes. Some of the techniques are easier for health professionals to provide to journalists, such as statistics and response efficacy information, and others may largely be at the discretion of the journalists, such as the inclusion of profiles and detailed self-efficacy information. Perceived self-efficacy is perhaps the most difficult of the four EPPM components to develop in individuals because it can be specific to a domain of behaviors, a population, or even an individual, but it is also in some ways the most important of the four components (Maibach and Murphy, 1995). As mentioned previously, if articles lack threat messages, they may fail to have any effect. In contrast, articles that contain threat messages but lack efficacy messages can have potentially damaging and long-lasting effects.

Some methods of enhancing self-efficacy may not apply easily to newspaper articles, such as trying to affect a reader's emotional state or direct attempts at persuasion. Other methods such as addressing barriers to self-efficacy and providing the reader with information to overcome them, including more examples of vicarious experience or role modeling, and providing detailed steps for how to carry out the behavior can be communicated more easily in newspaper articles. Journalists are bound by time and space

(in the publication), so providing them with clear and concise efficacy information or pointing them towards additional sources of efficacy information, as well as making the persuasive case that it will benefit readers, might increase the likelihood that efficacy messages will be included in the final version of the article (Stuyck, 1990).

Health professionals should keep in mind that an article will be more likely to motivate disease prevention responses in readers if it includes all four components of the EPPM. This means including information about the severity of the disease and the public's susceptibility to the disease, as well as telling readers that a particular behavior will reduce the risk of developing the disease and giving readers information about how to carry out that behavior. Within this framework there is quite a bit of room for variation in the delivery. Journalists often naturally include several of the EPPM components in articles simply by telling the story of the disease--most articles contain at least several components--so providing journalists with information that will satisfy each component will increase the likelihood that the information will make it into the article.

Longer articles give journalists an opportunity to use profiles and personal narratives to tell a more complex and emotionally compelling story about health and disease. Including personal stories in an article provides a frame in which to convey information about the impact of the disease in the lives of individuals (severity), what characteristics or lifestyle habits can cause the disease (susceptibility), what behaviors individuals can adopt to prevent or reduce the risk of disease (response efficacy), and how individuals have incorporated healthy behaviors into their daily lives (self-efficacy). Studies have specifically found personal narratives to be more effective than only using statistics to communicate susceptibility to disease (De Wit, Das, and Vet, 2008). Health

professionals can encourage journalists to include profiles and personal narratives in articles by directing them to individuals who are willing to tell personal stories of how disease or the threat of disease may have affected their lives.

Using a profile or personal narrative is also an excellent way to incorporate role modeling into an article by demonstrating how other people have made healthy changes in their lives, which can promote self-efficacy in readers. Longer articles with profiles also give journalists space to further promote efficacy in readers by discussing common challenges people face in adopting disease prevention behaviors and how to overcome them. Providing journalists with information about barriers to performing healthy behaviors and details about how to successfully make healthy changes can help to promote self-efficacy in readers. This information is extremely critical in providing effective disease prevention information to readers.

Even if an article must be kept short, it is still possible for journalists to include all four components of the EPPM and craft an effective article. In this case, health professionals should provide journalists with statistics and bulleted lists. Short articles often lack information about the severity of the disease and concrete tips for how to implement prevention behaviors. Health professionals can help journalists communicate severity briefly by giving them a statistic or a description of the negative consequences of the disease. Providing a list of risk factors can help journalists convey susceptibility. A sentence that tells readers what to do to reduce the risk of disease and a bulleted list of recommended behaviors will give journalists the information necessary to help readers make the appropriate lifestyle changes.

The four EPPM components can be included in disease prevention articles in various forms and by using a variety of techniques, including the ones studied in this paper. Of course, the more information provided, the better for the reader, but even very brief articles can be presented effectively. Longer articles allow journalists ample opportunity to include all four components and if provided with the appropriate information by health professionals they may be more likely to do so. Since the public can benefit greatly from presenting disease prevention information using the EPPM as a guide, health professionals would be advised to use this knowledge to provide journalists with the information necessary for crafting effective articles.

Limitations

The inclusion of only newspapers in this study limited analysis to one media source when, in reality, people are exposed to and seek out health information from a variety of media sources (Dutta-Bergman, 2004; NCI, 2005; O’Keefe, Boyd, and Brown, 1998). In addition, I analyzed only three newspapers, all of which are national papers based in the Eastern U.S. Therefore, these results may not be generalizable to smaller, local newspapers. Also, I drew the articles for analysis from only two years of coverage, and identified a trigger as influencing the coverage in 2006. A different trigger could have resulted in different coverage, which in turn could have altered the percentages of EPPM components for the overall sample.

An additional limitation was the application of a theoretical model for designing persuasive health messages to a medium with the general purpose of informing or educating rather than persuading. The EPPM is generally used to develop messages targeted to a particular audience. When there is no specific audience, as in this study, and

messages are simply being broadcast to the general public, the effects are likely to vary among readers.

Additionally, the application of the EPPM in this study did not consider the intensity of threat and efficacy messages. During the coding process, I observed that some messages seemed to be weaker than others, but I did not account for this in the coding. The EPPM predicts, and research has generally confirmed, that fear appeals are most successful when they contain high-threat and high-efficacy messages (Witte and Allen, 2000). Certain message techniques are used to create high-threat messages, including the use of vivid and intense language, direct rather than vague language, and personal narratives (Murray-Johnson and Witte, 2003; Witte, 1992b). I identified several of these techniques in the coding process, and I could have focused more attention in this study on the level of threat as well as the level of efficacy. I also could have identified varying levels of threat and efficacy by the number of messages in each article. Based on the coding scheme used in this study, articles could have appeared to contain both threat and efficacy messages. However, if I had counted the number of messages, it would become apparent when the article placed more emphasis on threat because the number of threat messages would be greater than the number of efficacy messages or vice versa.

There are also limitations to the EPPM itself, which factor into this research and our ability to make assumptions about message design and effects. First, the EPPM tells us how to design messages and what components to include for a potentially positive effect, but it does not provide details of the underlying emotional and cognitive processes occurring in individuals when they receive and process messages. For example, we do not know what emotional or cognitive threshold must be reached in order to induce

processing of the message. We also do not know what it really requires to foster perceptions of severity, susceptibility, and self-efficacy in individuals. It is not known exactly what elements are needed in a message in order to develop perceptions of each of the components. What it takes to develop these perceptions can also change over time, not just individually but culturally. Studies that use the EPPM currently test messages to confirm that they evoke fear, severity, or susceptibility in people. However, the EPPM does not tell us exactly how to design messages to achieve this. Although the EPPM can be a helpful guide for health professionals and researchers who want to design effective health risk messages, it does not tell us everything about how to develop the desired perceptions.

Future research

To provide a better understanding of the extent to which the public is exposed to threat and efficacy messages in news media, future research could expand this study to include local newspapers as well as other news media sources, such as television, Internet, and additional print sources. Also, research on the characteristics of articles that are more likely to include all four EPPM components or that are more likely to include self-efficacy messages--since these messages were most often missing in articles--would be potentially helpful in understanding how to increase the presence of these messages in articles.

It would also be helpful to answer the question: what does it mean to include self-efficacy messages in newspaper articles and other news media sources? The EPPM and other behavior change theories are usually used to develop persuasive messages targeted to particular audiences. How can this be applied to a traditionally informative (rather than

persuasive) context, such as news media? Other researchers have also lamented the absence of self-efficacy messages in newspaper articles about disease prevention, but figuring out how to increase their presence is a challenge (Moriarty and Stryker, 2008).

Research on how to design effective self-efficacy messages that would be appropriate for inclusion in news media contexts would be useful. If newspaper articles are not targeted to a particular audience, would refuting barriers common to most people be enough to enhance self-efficacy in most people? In terms of including information about how to carry out behaviors, it would be helpful to conduct audience effects research on how much information is needed to enhance self-efficacy. Are four tips or steps, as coded for in this study, enough to enhance self-efficacy or would most readers need at least six tips or steps? This knowledge would provide a useful guideline for how to include effective self-efficacy messages in news media sources. Even if journalists immediately started including more self-efficacy messages in articles, it could very well be that the messages may not have an effect anyway. Having some guidelines or a framework for understanding the effects of efficacy messages in news media would be very useful. Since journalists often operate within a tight schedule, it would be extremely helpful to have some of these questions answered so this information could be packaged for their use.

A final interesting and useful area of research would be to further examine how diabetes is being framed in newspaper articles and other news media sources in terms of susceptibility. In this study, articles about diabetes were significantly more likely to single out race or ethnic origin in the context of susceptibility to the disease. It would be interesting to discover whether race, ethnicity, and socioeconomic status are a significant

part of the how news media define susceptibility to diabetes as well as how this may affect public understanding of susceptibility to the disease.

Conclusion

Although newspapers are still an important tool for the dissemination of health information to the public, this information is generally not presented in a way that will promote risk-reducing behavior. Overall, newspaper articles do a better job of including susceptibility messages and mentioning risk factors than including severity messages, and they do a fairly poor job of including self-efficacy messages. The absence of a severity message in approximately half (48%) of the articles and the absence of a self-efficacy message in two-thirds (66%) of the articles are of particular concern because the articles selected for this study were about prevention. If articles imply the threat and do not include self-efficacy messages, prevention efforts may be seriously hindered.

Newspaper articles on disease prevention must contain all four components of the EPPM in order to be effective in prompting risk-reducing behaviors. This study found that only 10% of articles about heart disease and diabetes prevention include all four components. The vast majority of disease prevention articles fall far short of what is needed to have a beneficial impact on the public. This shortfall may be reflected in the continually high incidence and mortality rates of heart disease and type 2 diabetes.

Appendix

Codebook for Newspaper Articles on Heart Disease and Diabetes

Note: Do not code messages about cerebral vascular disease (stroke), drug-related prevention, or treatment that may appear in the articles.

A: ARTICLE #

B: PAPER

1=New York Times

2=USA Today

3=Wall Street Journal

C: YEAR

1=2006

2=2007

D: DISEASE

The article is mostly about:

1=Heart disease

2=Diabetes

3=Equally addresses heart disease and diabetes

E: PREVENTION FOCUS

What are the prevention efforts in the article primarily focused on?

1=Obesity/Weight control

2=Diet

3=Physical activity

4=Smoking

5=General lifestyle (mention a number of lifestyle changes, but do not focus on one)

6=Other

Note: If article focuses on weight loss, and exercise and diet are discussed in order to achieve weight loss, code 1. If article is mostly about diet, and weight loss is discussed in conjunction with diet, code 2.

SEVERITY

F: SEVERITY MESSAGES

Does the article contain one or more messages that promote the seriousness of the disease (often messages about death, for example, the number of deaths each year, “leading cause of death,” “number 1 killer,” “shortened lifespan,” etc.), the negative consequences of having the disease (e.g., death, heart attack, amputation, blindness, disability, high financial cost to individuals/families, etc.), or the use of intense descriptive language (including adjectives such as “grim,” “grueling,” “devastating,” etc.)?

Note: These messages should be about the *harm* caused by the disease.

1=Yes

0=No

DESCRIPTION OF SEVERITY MESSAGES:

G: SEV: # OR STAT

Does the article use a number or statistic to convey the severity of the disease?

(Note: Do not code numbers or statistics describing the prevalence of the disease here.

These are not severity messages.)

1=Yes

0=No

H: SEV: CONSEQUENCES

Does the article include a description of the negative consequences of the disease (e.g., death, heart attack, amputation, blindness, disability, high financial cost to individuals/families, etc.)?

1=Yes

0=No

I: SEV: LANGUAGE

Does the article use intense, vivid, or descriptive language (including adjectives such as “grim,” “grueling,” “devastating,” etc.) about the harm or consequences of the disease in order to convey the severity of the disease?

1=Yes

0=No

J: SEV: TESTIMONIAL

Does the article use a testimonial or personal narrative about the impact of the disease in one’s own life (can be in the form of a quote) to convey the severity of the disease?

1=Yes

0=No

K: MESSAGES THAT MINIMIZE SEVERITY

Does the article contain one or more messages that undermine the seriousness or severity of the disease? For example, statements about the decline in deaths from the disease or its complications, or statements that emphasize how advances in medicine and technology make the disease very treatable.

1=Yes

0=No

SUSCEPTIBILITY

L: SUSCEPTIBILITY MESSAGES

Does the article contain one or more messages that promote the likelihood of experiencing the disease?

1=Yes

0=No

DESCRIPTION OF SUSCEPTIBILITY MESSAGES:

M: SUSCEP: NUMBER OR PROBABILITY

Does the article use a number or probability to convey susceptibility to the disease?

For example:

- The number of people at risk for the disease or who have the disease (# of cases, prevalence of disease)
- The probability of getting the disease
- The number of people who have a risk factor

Example: “Approximately 19 million Americans have diabetes” or “One in 20 people will develop diabetes this year” or “65% of Americans are overweight or obese, which puts them at risk for developing type 2 diabetes”

1=Yes

0=No

N: SUSCEP: RISK FACTORS

Does the article mention factors that can increase the risk of developing the disease?

(For example: being overweight, having a BMI above a certain number, having high blood pressure, leading a sedentary lifestyle, eating a diet low in fruits and vegetables, being above a certain age, etc.)

1=Yes

0=No

O: SUSCEP: TESTIMONIAL/PROFILE

Does the article use a personal narrative, testimonial, or profile to convey susceptibility to the disease?

(For example, this could be a message in a narrative about someone who developed the disease who did not believe he/she was at risk.)

1=Yes

0=No

P: GROUPS IDENTIFIED

Does the article focus on or single out any specific groups (identified by race, ethnicity, gender, socioeconomic status, geographic location, age, or another differentiating characteristic) as being at particular risk for the disease?

1=Yes

0=No

Q: RACE/ETHNIC ORIGIN

Were race or ethnic origin emphasized or singled out in the article in terms of susceptibility to the disease?

1=Yes

0=No

R: GENDER

Was gender emphasized or singled out in the article in terms of susceptibility to the disease?

1=Yes

0=No

S: AGE

Was age emphasized or singled out in the article in terms of susceptibility to the disease?

1=Yes

0=No

T: OBESITY

Was obesity emphasized or singled out in the article in terms of susceptibility to the disease?

(Note: Code if the article *only* mentions “obesity.” Do not code if the article mentions being “overweight or obese.”)

1=Yes

0=No

RESPONSE EFICACY

U: RECOMMENDED RESPONSES

Does the article *explicitly* promote one or more behaviors or responses for reducing the threat of the disease?

For example: lose weight, increase physical activity, improve diet, lower cholesterol, lower blood pressure, quit smoking, etc.

**Do not code if recommended response is implied but not explicit.

**Do not code if recommended response is aimed at physicians/clinicians.

1=Yes

0=No

V: RESPONSE EFFICACY MESSAGES

Are the recommended responses described as working to reduce the threat of disease?

In other words, they do not just tell the reader to do something, but they specifically say that it is effective (that it works). For example, statements such as:

- “Lifestyle changes, such as a healthy diet and lots of exercise, have been proven to reduce the risk of heart disease.”
- “Eating right and exercising are the best way to prevent diabetes.”
- “If we can lower an individual’s cholesterol, we can significantly reduce that person’s risk of heart disease.”

(Note: If the article does not somehow communicate the effectiveness of the recommended response, then code 0.)

1=Yes

0=No

SELF-EFFICACY

W: SELF-EFFICACY MESSAGES

Does the article contain one or more messages that promote the ability to engage in some recommended behavioral response?

(Messages that promote self-efficacy try to increase feelings of competence, confidence, and ability in the reader. See list of techniques below for examples of how messages promote self-efficacy.)

Examples include:

- “Making the necessary lifestyles changes is easy; you just have to believe in yourself.”
- A description of what foods to eat for a healthier diet
- A description of how to get started with exercise
- A profile of someone who has successfully made changes in his/her life to improve their health

1=Yes

0=No

DESCRIPTION OF SELF-EFFICACY MESSAGES:

X: SELF MESSAGES

Does the article contain one or more messages that bolster the self (that say the self can do it)? These are messages that tell readers they are capable, that they can avert the threat or carry out the behavior, that they have control over their health, etc.

1=Yes

0=No

Y: VERBAL PERSUASION

Does the article contain one or more messages that attempt to persuade readers to carry out the behavior? This is usually a first-person appeal by the writer directly to the readers to carry out the behavior.

For example: “I urge you, at this holiday season, to avoid the temptation to eat whatever treats are in front of you, and to remember your heart health.”

1=Yes

0=No

Z: INFORMATION/KNOWLEDGE/STEPS

Does the article include more than three steps, behaviors, or tips for carrying out the recommended behavior?

1=Yes

0=No

AA: ROLE MODELING

Does the article promote self-efficacy by mentioning others who have carried out the behavior?

1=Yes

0=No

AB: BARRIERS

Does the article mention barriers to carrying out the behavior?

Examples of barriers are: financial cost, physical discomfort, fear of injury, environmental limitations, social costs, etc. For example, in “it’s hard for people to make time for exercise,” time is the barrier. Barriers can also be psychological or emotional limitations. For example, in “many pre-diabetics have difficulty sticking to a healthy diet,” the barrier(s) may be internal (psychological) and/or external (time, environment, culture).

1=Yes

0=No

AC: BARRIERS REFUTED

Are the barriers in the article refuted with information or a statement to encourage the reader to overcome the barrier?

1=Yes

0=No

AD: ORDER OF MESSAGES

The severity and susceptibility messages should appear before the response efficacy and self-efficacy messages in the article.

(Note: If order is anything other than threat followed by efficacy, code 0.)

1=Order is correct

0=Order is not correct

TRIGGER QUESTIONS:

AE: TRANS FAT

Does the article mention trans fat?

1=Yes

0=No

AF: FAST FOOD

Does the article mention fast food?

1=Yes

0=No

References

- Adelman, R. C., & Verbrugge, L. M. (2000). Death makes news: The social impact of disease on newspaper coverage. *Journal of Health and Social Behavior, 41*, 347-367.
- Aljaseem, L. I., Peyrot, M., Wissow, L., & Rubin, R. R. (2001). The impact of barriers and self-efficacy on self-care behaviors in type 2 diabetes. *The Diabetes Educator, 27*(3), 393-404.
- Allen, M. (1991). Meta-analysis comparing the persuasiveness of one-sided and two-sided messages. *Western Journal of Speech Communication, 55*, 390-404.
- American Diabetes Association. (2008). *Complications of diabetes in the United States*. Retrieved April 15, 2008, from <http://www.diabetes.org/diabetes-statistics/complications.jsp>
- American Heart Association. (2008). *Risk factors and coronary heart disease*. Retrieved April 15, 2008, from <http://www.americanheart.org/presenter.jhtml?identifier=500>
- Atkin, C., & Arkin, E. B. (1990). Issues and initiatives in communicating health information to the public. In C. Atkin & L. Wallack (Eds.), *Mass communication and public health: Complexities and conflicts* (pp. 13-40). Newbury Park, CA: Sage Publications.
- Atkin, C. K., Smith, S. W., McFeters, C., & Ferguson, V. (2008). A comprehensive analysis of breast cancer news coverage in leading media outlets focusing on environmental risks and prevention. *Journal of Health Communication, 13*, 3-19.
- Audit Bureau of Circulations. (2008, March 31). *U.S. newspaper: Total circulation*. Retrieved April 20, 2008, from <http://abcas3.accessabc.com/ecirc/newstitlesearchus.asp>

- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84(2), 191-215.
- Beck, K. H., & Frankel, A. (1981). A conceptualization of threat communications and protective health behavior. *Social Psychology Quarterly*, 44(3), 204-217.
- Beck, K. H., & Lund, A. K. (1981). The effects of health threat seriousness and personal efficacy upon intentions and behavior. *Journal of Applied Social Psychology*, 11(5), 401-415.
- Berry, T. R., Wharf-Higgins, J., & Naylor, P. J. (2007). SARS wars: An examination of the quantity and construction of health information in the news media. *Health Communication*, 21(1), 35-44.
- Bishop, D. B., Zimmerman, B. R., & Roesler, J. S. (1998). Diabetes. In R. C. Brownson, P. L. Remington, & J. R. Davis (Eds.), *Chronic disease epidemiology and control* (2nd ed., pp. 297-334). Washington, D.C.: American Public Health Association.
- Bloomgarden, Z. T. (2004). Type 2 diabetes in the young: The evolving epidemic. *Diabetes Care*, 27(4), 998-1010.
- Bonnar-Kidd, K. K. (2006). *Physical activity on the Internet: Will typical users find quality information?* Unpublished doctoral dissertation, Purdue University, West Lafayette, Indiana.
- Bottorff, J. L., Ratner, P. A., Johnson, J. L., Lovato, C. Y., & Joab, S. A. (1998). Communicating cancer risk information: The challenges of uncertainty. *Patient Education and Counseling*, 33, 67-81.
- Brown, J. D., & Walsh-Childers, K. (2002). Effects of media on personal and public health. In J. Bryant & D. Zillman (Eds.), *Media effects: Advances in theory and*

- research* (2nd ed., pp. 453-488). Mahwah, NJ: Lawrence Erlbaum Associates.
- Centers for Disease Control and Prevention. (2005). *National diabetes fact sheet: United States, 2005*. Retrieved April 20, 2008, from http://apps.nccd.cdc.gov/DDTSTRS/template/ndfs_2005.pdf
- Centers for Disease Control and Prevention. (2007, January 30). Prevalence of overweight and obesity among adults: United States, 2003-2004. *National Center for Health Statistics: Health E-Stats*. Retrieved June 10, 2008, from http://www.cdc.gov/nchs/products/pubs/pubd/hestats/overweight/overwght_adult_03.htm#Table%201
- Clarke, J. N. (1992). Cancer, heart disease, and AIDS: What do the media tell us about these diseases? *Health Communication, 4*(2), 105-120.
- Combs, B., & Slovic, P. (1979). Newspaper coverage of causes of death. *Journalism Quarterly, 56*, 837-849.
- Condit, C., & Parrott, R. (2004). Perceived levels of health risk associated with linguistic descriptors and type of disease. *Science Communication, 26*(2), 152-161.
- Covello, V. T., & Peters, R. G. (2002). Women's perceptions of the risks of age-related diseases, including breast cancer: Reports from a 3-year research study. *Health Communication, 14*(3), 377-395.
- Covello, V. T., Winterfeldt, D. von, & Slovic, P. (1986). Risk communication: A review of the literature. *Risk Abstracts, 3*, 171-182.
- Dabbs, J. M., Jr., & Leventhal, H. (1966). Effects of varying the recommendations in a fear-arousing communication. *Journal of Personality and Social Psychology, 4*(5), 525-531.
- De Wit, J. B. F., Das, E., & Vet, R. (2008). What works best: Objective statistics or a

- personal testimonial? An assessment of the persuasive effects of different types of message evidence on risk perception. *Health Psychology, 27*(1), 110-115.
- Desharnais, R., Bouillon, J., & Godin, G. (1986). Self-efficacy and outcome expectations as determinants of exercise adherence. *Psychological Reports, 59*, 1155-1159.
- Dutta-Bergman, M. J. (2004). Primary sources of health information: Comparisons in the domain of health attitudes, health cognitions, and health behaviors. *Health Communication, 16*(3), 273-288.
- Finnegan, J. R., Viswanath, K., & Hertog, J. (1999). Mass media, secular trends, and the future of cardiovascular disease health promotion: An interpretive analysis. *Preventive Medicine, 29*, S50-S58.
- Ford, E. S., Ajani, U. A., Croft, J. B., Critchley, J. A., Labarthe, D. R., Kottke, T. E., Giles, W. H., & Capewell, S. (2007). Explaining the decrease in U.S. deaths from coronary disease, 1980-2000. *The New England Journal of Medicine, 356*(23), 2388-2398.
- Freimuth, V. S., Greenberg, R. H., DeWitt, J., & Romano, R. M. (1984). Covering cancer: Newspapers and the public interest. *Journal of Communication, 34*(1), 62-73.
- Frost, K., Frank, E., & Maibach, E. (1997). Relative risk in the news media: A quantification of misrepresentation. *American Journal of Public Health, 87*(5), 842-845.
- Gerend, M. A., Aiken, L. S., & West, S. G. (2004). Personality factors in older women's perceived susceptibility to diseases of aging. *Journal of Personality, 72*(2), 243-270.
- Gray, G. M., & Ropeik, D. P. (2002). Dealing with the dangers of fear: The roles of risk communication. *Health Affairs, 21*(6), 106-116.

- Gump, B. B., & Kulik, J. A. (1995). The effect of a model's HIV status on self-perceptions: A self-protective similarity bias. *Personality and Social Psychology Bulletin*, 21(8), 827-833.
- Hale, J. L., & Dillard, J. P. (1995). Fear appeals in health promotion campaigns: Too much, too little, or just right? In E. Maibach & R. L. Parrott (Eds.), *Designing health messages: Approaches from communication theory and public health practice* (pp. 65-80). Thousand Oaks, CA: Sage Publications.
- Holtgrave, D. R., Tinsley, B. J., & Kay, L. S. (1995). Encouraging risk reduction: A decision-making approach to message design. In E. Maibach & R. L. Parrott (Eds.), *Designing health messages: Approaches from communication theory and public health practice* (pp. 24-40). Thousand Oaks, CA: Sage Publications.
- Klaidman, S. (1990). Roles and responsibilities of journalists. In C. Atkin & L. Wallack (Eds.), *Mass communication and public health: Complexities and conflicts* (pp. 60-70). Newbury Park, CA: Sage Publications.
- Kline, K. N., & Mattson, M. (2000). Breast self-examination pamphlets: A content analysis grounded in fear appeal research. *Health Communication*, 12(1), 1-21.
- Knowler, W. C., Barrett-Connor, E., Fowler, S. E., Hamman, R. F., Lachin, J. M., Walker, E. A., & Nathan, D. M. (2002). Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *The New England Journal of Medicine*, 346(6), 393-403.
- Kung, H.-C., Hoyert, D. L., Xu, J., & Murphy, S. L. (2007, September 12). Deaths: Preliminary data for 2005. *National Center for Health Statistics: Health E-Stats*. Retrieved April 5, 2008, from <http://www.cdc.gov/nchs/products/pubs/pubd/hestats/>

prelimdeaths05/prelimdeaths05.htm

- Landis, J. R., & Koch, G. G. (1977). The measurement of observer agreement for categorical data. *Biometrics*, *33*(1), 159-174.
- Lapinski, M. K. (2006). Starvingforperfect.com: A theoretically based content analysis of pro-eating disorder web sites. *Health Communication*, *20*(3), 243-253.
- Lek, Y., & Bishop, G. D. (1995). Perceived vulnerability to illness threats: The role of disease type, risk factor perception and attributions. *Psychology and Health*, *10*, 205-217.
- Maddux, J. E., & Rogers, R. W. (1983). Protection motivation and self-efficacy: A revised theory of fear appeals and attitude change. *Journal of Experimental Social Psychology*, *19*, 469-479.
- Maibach, E., & Murphy, D. A. (1995). Self-efficacy in health promotion research and practice: Conceptualization and measurement. *Health Education Research*, *10*(1), 37-50.
- McKay, D. L., Berkowitz, J. M., Blumberg, J. B., & Goldberg, J. P. (2004). Communicating cardiovascular disease risk due to elevated homocysteine levels: Using the EPPM to develop print materials. *Health Education & Behavior*, *31*(3), 355-371.
- Mokdad, A. H., Bowman, B. A., Ford, E. S., Vinicor, F., Marks, J. S., & Koplan, J. P. (2001). The continuing epidemics of obesity and diabetes in the United States. *The Journal of the American Medical Association*, *286*(10), 1195-1200.
- Mokdad, A. H., Ford, E. S., Bowman, B. A., Dietz, W. H., Vinicor, F., Bales, V. S., & Marks, J. S. (2003). Prevalence of obesity, diabetes, and obesity-related health risk

- factors, 2001. *The Journal of the American Medical Association*, 289(1), 76-79.
- Moriarty, C. M., & Stryker, J. E. (2008). Prevention and screening efficacy messages in newspaper accounts of cancer. *Health Education Research*, 23(3), 487-498.
- Morman, M. T. (2000). The influence of fear appeals, message design, and masculinity on men's motivation to perform the testicular self-exam. *Journal of Applied Communication Research*, 28(2), 91-116.
- Murray-Johnson, L., & Witte, K. (2003). Looking toward the future: Health message design strategies. In A. M. Dorsey, K. I. Miller, R. Parrott, & T. L. Thompson (Eds.), *Handbook of health communication* (pp. 473-495). Mahwah, NJ: Lawrence Erlbaum Associates.
- National Cancer Institute. (2003). *Health Information National Trends Survey*. Retrieved April 20, 2008, from <http://hints.cancer.gov/questions/hc-hc.jsp>
- National Cancer Institute. (2005). *Health Information National Trends Survey*. Retrieved April 20, 2008, from <http://hints.cancer.gov/questions/hc-hc.jsp>
- National Heart Lung and Blood Institute. (April 2008). *What is coronary artery disease?* Retrieved April 20, 2008, from http://www.nhlbi.nih.gov/health/dci/Diseases/Cad/CAD_WhatIs.html
- National Institute of Diabetes and Digestive and Kidney Diseases (December 2006). *Am I at risk for type 2 diabetes? Taking steps to lower your risk of getting diabetes* (NIH Publication No. 07-4805). Retrieved April 20, 2008, from <http://www.diabetes.niddk.nih.gov/dm/pubs/riskfortype2/index.htm>
- Newschaffer, C. J., Brownson, C. A., & Dusenbury, L. J. (1998). Cardiovascular disease. In R. C. Brownson, P. L. Remington, & J. R. Davis (Eds.), *Chronic disease*

- epidemiology and control* (2nd ed., pp. 297-334). Washington, D.C.: American Public Health Association.
- O'Keefe, G. J., Boyd, H. H., & Brown, M. R. (1998). Who learns preventive health care information from where: Cross-channel and repertoire comparisons. *Health Communication, 10*(1), 25-36.
- Orwin, R. G. (1994). Evaluating coding decisions. In H. Cooper & L. V. Hedges (Eds.), *The handbook of research synthesis* (pp. 139-162). New York, NY: Russell Sage Foundation.
- Parrott, R. L. (1995). Motivation to attend to health messages: Presentation of content and linguistic considerations. In E. Maibach & R. L. Parrott (Eds.), *Designing health messages: Approaches from communication theory and public health practice* (pp. 7-21). Thousand Oaks, CA: Sage Publications.
- Project for Excellence in Journalism. (2006). *The state of the news media 2006: An annual report on American journalism*. Retrieved April 20, 2008, from http://www.stateofthenewsmedia.org/2006/narrative_newspapers_contentanalysis.asp?cat=2&media=3
- Project for Excellence in Journalism. (2008). *The state of the news media 2008: An annual report on American journalism*. Retrieved April 20, 2008, from http://www.stateofthenewsmedia.org/2008/narrative_overview_contentanalysis.php?cat=2&media=1
- Rimal, R. N., & Morrison, D. (2006). A uniqueness to personal threat (UPT) hypothesis: How similarity affects perceptions of susceptibility and severity in risk assessment. *Health Communication, 20*(3), 209-219.

- Rock, M. (2005). Diabetes portrayals in North American print media: A qualitative and quantitative analysis. *American Journal of Public Health, 95*(10), 1832-1838.
- Ropeik, D., & Slovic, P. (2003). Risk communication: A neglected tool in protecting public health. *Risk in Perspective, 11*(2), 1-4.
- Rothman, A. J., Bartels, R. D., Wlaschin, J., & Salovey, P. (2006). The strategic use of gain- and loss-framed messages to promote health behavior: How theory can inform practice. *Journal of Communication, 56*, S202-S220.
- Rothman, A. J., Kelly, K. M., Hertel, A. W., & Salovey, P. (2003). Message frames and illness representations: Implications for interventions to promote and sustain healthy behavior. In L. D. Cameron & H. Leventhal (Eds.), *The self-regulation of health and illness behaviour* (pp. 278-296). London, U.K.: Routledge.
- Rothman, A. J., & Kiviniemi, M. T. (1999). Treating people with information: An analysis and review of approaches to communicating health risk information. *Journal of the National Cancer Institute Monographs, 25*, 44-51.
- Rothman, A. J., & Salovey, P. (1997). Shaping perceptions to motivate healthy behavior: The role of message framing. *Psychological Bulletin, 121*(1), 3-19.
- Saad, L. (2007, December 3). "Access" gains as top perceived U.S. health problem. Retrieved April 10, 2008, from <http://www.gallup.com/poll/102964/Access-Gains-Top-Perceived-US-Health-Problem.aspx>
- Scott, L. B., & Curbow, B. (2006). The effect of message frames and CVD risk factors on behavioral outcomes. *American Journal of Health Behavior, 30*(6), 582-597.
- Shen, L., & Dillard, J. P. (2007). The influence of behavioral inhibition/approach systems and message framing on the processing of persuasive health messages.

Communication Research, 34(4), 433-467.

Singer, E., & Endreny, P. M. (1993). *Reporting on risk: How the mass media portray accidents, diseases, disasters, and other hazards*. New York, NY: Russell Sage Foundation.

Stephenson, M. T., & Witte, K. (1998). Fear, threat, and perceptions of efficacy from frightening skin cancer messages. *Public Health Review*, 26, 147-174.

Strecher, V. J., DeVellis, B. M., Becker, M. H., & Rosenstock, I. M. (1986). The role of self-efficacy in achieving health behavior change. *Health Education Quarterly*, 13(1), 73-91.

Stryker, J. E. (2003). Media and marijuana: A longitudinal analysis of news media effects on adolescents' marijuana use and related outcomes, 1977-1999. *Journal of Health Communication*, 8, 305-328.

Stryker, J. E., Moriarty, C., & Jensen, J. D. (2005, May). *Effects of newspaper coverage on public knowledge about cancer prevention: Priming cancer prevention knowledge*. Paper presented at the annual meeting of the International Communication Association, New York, NY.

Stryker, J. E., Solky, B. A., & Emmons, K. M. (2005). A content analysis of news coverage of skin cancer prevention and detection, 1979 to 2003. *Archives of Dermatology*, 141, 491-496.

Stuyck, S. C. (1990). Public health and the media: Unequal partners? In C. Atkin & L. Wallack (Eds.), *Mass communication and public health: Complexities and conflicts* (pp. 71-77). Newbury Park, CA: Sage Publications.

Van Empelen, P., Schaalma, H. P., Kok, G., & Jansen, M. W. J. (2001). Predicting

- condom use with casual and steady sex partners among drug users. *Health Education Research, 16*(3), 293-305.
- Weinstein, N. D. (1982). Unrealistic optimism about susceptibility to health problems. *Journal of Behavioral Medicine, 5*(4), 441-460.
- Weinstein, N. D. (1983). Reducing unrealistic optimism about illness susceptibility. *Health Psychology, 2*(1), 11-20.
- Weinstein, N. D. (1984). Why it won't happen to me: Perceptions of risk factors and susceptibility. *Health Psychology, 3*(5), 431-457.
- Witte, K. (1992a). Putting the fear back into fear appeals: The extended parallel process model. *Communication Monographs, 59*, 329-349.
- Witte, K. (1992b). Message and conceptual confounds in fear appeals: The role of threat, fear, and efficacy. *The Southern Communication Journal, 58*, 147-155.
- Witte, K. (1994). Generating effective risk messages: How scary should your risk communication be? *Communication Yearbook, 18*, 229-254.
- Witte, K. (1998). Fear as motivator, fear as inhibitor: Using the extended parallel process model to explain fear appeal successes and failures. In P. A. Andersen & L. K. Guerrero (Eds.), *Handbook of communication and emotion: Research, theory, applications, and contexts* (pp. 423-450). San Diego, CA: Academic Press.
- Witte, K., & Allen, M. (2000). A meta-analysis of fear appeals: Implications for effective public health campaigns. *Health Education & Behavior, 27*(5), 591-615.
- Witte, K., Berkowitz, J. M., Cameron, K. A., & McKeon, J. K. (1998). Preventing the spread of genital warts: Using fear appeals to promote self-protective behaviors. *Health Education & Behavior, 25*(5), 571-585.

- Witte, K., Cameron, K. A., McKeon, J. K., & Berkowitz, J. M. (1996). Predicting risk behaviors: Development and validation of a diagnostic scale. *Journal of Health Communication, 1*, 317-341.
- Witte, K., Meyer, G., & Martell, D. (2001). *Effective health risk messages: A step-by-step guide*. Thousand Oaks, CA: Sage Publications.
- Yanovitzky, I., & Blitz, C. L. (2000). Effect of media coverage and physician advice on utilization of breast cancer screening by women 40 years and older. *Journal of Health Communication, 5*, 117-134.
- Zak-Place, J., & Stern, M. (2004). Health belief factors and dispositional optimism as predictors of STD and HIV preventive behavior. *Journal of American College Health, 52*(5), 229-236.

Curriculum Vitae

Susana Peinado received a B.A. in Philosophy from Grinnell College in Iowa. She has years of experience as a writer, editor, and communication professional for a variety of companies and organizations. In the Communication program at Johns Hopkins University, Susana developed a strong interest in health communication. Related academic interests include health risk message design, health communication campaigns, behavior change theories, and disease prevention.