COMMUNICATING MEDICAL ADVANCES IN TELEVISION HEALTH NEWS:
THE INFLUENCE OF A HUMAN INTEREST FRAME ON AUDIENCES'
COGNITIVE AND EMOTIONAL RESPONSES

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by

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The undersigned, appointed by the dean of the Graduate School, have examined the dissertation entitled

COMMUNICATING MEDICAL ADVANCES IN TELEVISION HEALTH NEWS:
THE INFLUENCE OF A HUMAN INTEREST FRAME ON AUDIENCES'
COGNITIVE AND EMOTIONAL RESPONSES

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DEDICATION

To my mom, dad, and little brother,

who have always given me their support and unconditional love.

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Although I have imagined this moment every single day for the past few years, I still cannot believe that now is the time to write the acknowledgements for my dissertation. In retrospect, I realize that the difficulties I had at graduate school helped me mature, and I could not have gotten through this on my own. In this regard, today's honor should be directed to a number of people I appreciate for all of their support and care.

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allowing me to have all of these great people with whom to celebrate my humble achievements and share my burden.

As I complete my dissertation and leave this school, I am excited to move on to the next chapter of my life. I dearly hope to become a respected scholar and mentor who can contribute to benefiting society, just like the outstanding faculty members I've learned from during my doctoral studies.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

COMMUNICATING MEDICAL ADVANCES IN TELEVISION HEALTH NEWS:
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ABSTRACT

The dissemination of scientific advances in medicine became popular in television health news over the last few decades. The purpose of this study is to investigate the influence of news frames in television health news reporting of scientific medical advances. Based on framing theory and exemplification theory, this study aims to examine individuals' cognitive and emotional reactions to the news stories in a human interest frame vs. a non-human interest frame.

A 2 (news frame: a human interest frame vs. a non-human interest frame) × 3 (health consciousness: low vs. medium vs. high) mixed factorial experiment was conducted. Responses from 98 participants were analyzed by repeated measures ANOVAs and bootstrapping analysis. Major findings indicate that human interest framing motivated audiences to become more involved in the news story and understand health information. In response to a human interest frame, people also tended to express greater level of hope and relief, and reported more favorable opinions about the medical achievement they watched. While both challenges and opportunities exist, this study elucidated that human interest framing could serve as a significant news framing tool to construct health news.

CHAPTER 1

INTRODUCTION

The media attention given to diverse health issues has been growing rapidly over the last few decades. With the drastic growth of health news, mass media have become the most popular channel for health information, reaching lay audiences as well as scientific communities of medical doctors/researchers and health-related policy makers (e.g., Brodie, Hamel, Altman, Blendon, & Benson, 2003; Chew, Mandelbaum-Schmid, & Gao, 2006; Clarke, 1992; Dutta-Bergman, 2004; Hesse, Nelson, Kreps, Croyle, Arora, Rimer, & Viswanath, 2005; Wang & Gantz, 2007, 2010). Of all media forms, television news is believed to be a key medium of health information because it can efficiently reach a wide spectrum of the population (Brodie et al., 2003). Moreover, it has also been shown that Americans prefer watching television to find health information, compared to other media channels, and about a half of them are closely attentive to health information disseminated by television news (Brodie et al., 2003). Reflecting audiences' heavy preference for health news delivered via television, health was one of the frequent topics (10%) of total news stories, along with crime (20%), weather (11%), and accidents/disasters (9%), in local television news programming (Wang & Gantz, 2007). The prevalence of health information in local television news remains strong, taking up to 8% of all news stories, with an average of 1.26 health news stories every 30 minutes (Wang & Gantz, 2010).

According to Wang and Gantz (2010), health information in local television news encompasses a wide array of topics, including "symptoms, causes, prevention, detection,

and treatments of physical and mental illness or infirmity, as well as policy, law, technology, and fundraising activities related to well-being" (p. 230). Previous studies have shown that news media play a major role in informing the public of scientific advances and research findings in health and medicine (e.g., disease prevention, diagnosis, treatment) (Entwistle, 1995; Viswanath, Blake, Meissner, Saiontz, Mull, Freeman, Hesse, & Croyle, 2008). In fact, 15.4% of health news stories in local television news programming dealt with medical advances in the research or professional fields, and were one of the top three categories[1] in health news broadcast on local television channels (Wang & Gantz, 2010). The frequent appearance of such medical advances in news media, including television, could be the result of several factors of the news media environment, such as audiences' growing attention to medical subjects, active public relations efforts of scientists and research institutes, and science/health journalists' heavy reliance on press releases from research institutes and scientific journals (Entwistle, 1995; Prabhu, Duffy, & Stapleton, 1996; Viswanath et al., 2008; Wilkes, 1997).

Despite the frequent appearance of medical advances in health news, however, little has been documented in regard to this specific type of health/medical news and how audiences perceive it. Therefore, this study attempts to examine the impact on individual audiences of health news stories about medical advances. This study questions how audiences cognitively and emotionally process television news coverage of medical advances, and the potential consequences of the news stories at an individual level. Specifically, this study focuses on the way television health news of medical advances is

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[1] Other categories included prevention (20.3%), treatment (20.4%), cause of illness (13.6%), health-related policy and law (9.5%), and detection (6.2%) (Wang & Gantz, 2010).

constructed (i.e., the news frame), and its influence on individuals' perceptions of health and medicine.

Significance of the study

Adverse medical conditions, such as heart disease and diabetes, are leading causes of death in the United States (Mokdad, Ford, Bowman, Dietz, Bales, & Marks, 2009; Park, 2009), and the social burden surrounding such preventable causes of death has become extensive during the last several years (Ezzati, Lopez, Rodgers, Vander Hoorn, & Murray, 2002; Mokdad, Marks, Stroup, & Gerberding, 2004). Given these circumstances, professional and scholarly attention to the role of news media has been growing in terms of health promotion and education. Previous studies have elucidated the power of news media in shaping individual knowledge, attitudes, and behaviors regarding a variety of health issues (Brodie et al., 2003; Thorson, 2006; Wallack, Dorfman, Jernigan, & Themba, 1993), such as AIDS (Snyder & Rouse, 1995), cardiovascular diseases and diabetes (Brannstrom & Lindblad, 1994), cancer (Niederdeppe, Frosch, & Hornik, 2008; Stryker, Moriarty, & Jensen, 2008), and binge drinking (Yanovitzky & Stryker, 2001). However, these studies mainly focused on a specific health issue. Although issue-specific studies can be useful, it should be noted that they are limited in generalizing the findings for other health topics because not all health topics are equivalent. This study is meaningful in that it identifies a significant subset of health news content (i.e., television health reports about medical advances) that is likely to share more common characteristics across diverse health issues. By doing so, this study expects to better predict and control the phenomena surrounding this health news content, and extend the

3

scope of the theories pertinent to television health news, news framing, and health information processing.

Additionally, there is a gap in academic research concerning several aspects of health news. First, previous studies have mostly ignored health news content from television while they have extensively probed portrayals of health news from print media, such as magazines and newspapers (e.g., Brown, Zavestoski, McCormick, Mandelbaum, & Luebke, 2001; Cohen, Caburnay, Luke, Rodgers, Cameron, & Kreuter, 2008; Davidson & Wallack, 2004; Entwistle, 1995; Jensen, Moriarty, Hurley, & Stryker, 2010; Shih, Wijaya, & Brossard, 2008). This neglect comes partly from limited accessibility and controllability of television news materials. In communicating scientific information through news media, however, television has turned out to be a more dominant source for laypersons than newspapers (National Science Foundation, 2010), and its impact on audiences is regarded as substantial. For example, among diverse news channels (e.g., newspaper, magazine, online news, radio news), national television viewing was the only significant predictor of positive public perception of stem cell research, which was a salient medical science issue in 2004 and 2005 (Liu & Priest, 2009). As Andsager and Powers (1999) highlighted, the characteristics of medium influence what and how health issues are presented, and presumably, consequences of exposure. Given the current penetration of health information through television news among lay audiences, studies on television health news should be valuable.

Second, it is worth noting that previous studies tended to deal with health news from the information provider's perspective, mostly by employing surveys of health and medical science journalists (e.g., Entwistle, 1995; Hinnant & Len-Rios, 2009; Len-Rios,

4

Hinnant, Park, Cameron, Frisby, & Lee, 2009; Tanner, 2004; Viswanath et al., 2008).

Scholars also investigated the different standpoints of journalists and scientists toward

health or medical news (e.g., Hartz & Chappell, 1997; Nelkin, 1995; Ransohoff &

Ransohoff, 2001). Otherwise, many studies on health news stemmed from analyzing the

health news content itself (e.g., Andsager & Powers, 1999; Entwistle, 1995; MacDonald,

2005; Wang & Gantz, 2007, 2010). As such, previous research has neglected the

perceptions of audiences, or news consumers' perspectives, although scholarly attention

to audiences' perceptions of health news has recently emerged. Hinnant and Len-Rios

(2009) also pointed out the necessity of studies on health news consumers. This study

expects to fill such a gap in health news research.

From a practical perspective, understanding how audiences respond cognitively

and emotionally to health messages with varying presentation styles (e.g., news frames)

will provide important information that may lead to a practical guide for journalists and

other communicators in the field of public health and medical science. Previous studies

examined the effects of health news (e.g., knowledge increase, healthy behavior changes)

in an aggregate by employing a survey asking about media use habits and health-related

outcomes (e.g., Hertog & Fan, 1995; Stryker, 2003). Although these studies imply macro-

level impacts of news media on health issues, they cannot ensure causal impact of

specific news features on individual audiences. Likewise, they are limited in providing

specific guidelines for message producers such as news reporters. As communication

scholars (e.g., Fishbein & Cappella, 2006) have argued, identifying specific message

features that effectively instigate desirable outcomes at an individual level is needed in

media effect research. By examining detailed message features, such as news frame, this

study attempts to fulfill the demand from academia and to help improve medical

journalism and health communication practices.

CHAPTER 2

LITERATURE REVIEW

This study is based on the idea that health news containing new medical advances is different from general health news and is often reported through a different news frame. Framing theory (Entman, 1993) provides a basis for the process through which journalists construct reality in the form of a news story (i.e., news framing) and its potential impact on individual audiences. Specifically, this study focuses on a human interest frame, which employs a personal exemplification to present an event. Based on exemplification theory (Zillmann, 1999; Zillmann & Brosius, 2000), research questions and hypotheses are proposed to predict the impact of human interest frame-employing human exemplars in reporting medical advances. This study also envisions mediating roles of audience involvement and emotional responses on the effect of human interest framing. Level of health consciousness is introduced as a potential moderator that may influence individuals' cognitive and emotional responses to news stories with or without a human interest element.

Medical advances in television health news

One of the major functions of health news is to disseminate the latest scientific developments regarding diagnosis, prevention, and treatment of specific diseases or other medical conditions (Andsager & Powers, 1999; Entwistle, 1995; Viswanath et al., 2008). Viswanath and colleagues highlighted the news media's role in this process by stating, "[T]hrough their routine coverage of scientific developments, news media are a critical

intermediary in translating research for the public, patients, practitioners, and policy makers" (Viswanath et al., 2008, p. 759). According to Wang and Gantz (2010), about 15.4% of health news stories in local television news address medical advances.

In the current study, medical advances are defined as up-to-date knowledge and technological innovations through scientific research and clinical trials pertinent to medical cures/treatment (e.g., medication, surgical procedure), detection/diagnosis technique or device (e.g., disease screening device, gene therapy), and disease-preventive technology (e.g., vaccine). Medical advances also include research findings and discoveries that may serve as underlying principles and mechanisms for any of the above. Research findings about a simple correlation between a factor and real-world disease occurrence with no scientific control is disregarded.[2] To meet the "medical advance" definition, research should provide scientific evidence for and verify the underlying principles behind the advance.

Compared to other health news, health news containing medical advances has unique characteristics. First, health news containing medical advances is more likely than general health news to involve scientific information, and thus is highly dependent on professional expertise in medical research. In other words, news stories about medical advances often involve explaining scientific information and translating scientific/medical jargon into lay English. Additionally, the main purpose of coverage of this type is to inform the public and increase the awareness of the topic *per se*, rather than to promote or encourage specific behavioral changes. In some cases, these news stories result from sponsorship of medical organizations, such as a university, a medical journal,

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[2] For example, information like "a specific disease was found to occur more often in men than in women" or "obesity rate turned out to be higher in urban areas than in rural areas" is not regarded as a scientific advance in medicine in this study.

a research funding organization, or a hospital, aiming to promote their achievement to public (Andsager & Powers, 1999; Tanner, 2004).

Given the nature of news coverage of medical advances, obstacles have also been reported in disseminating scientific information through news media, including: inaccurate or misleading information, exaggeration of research results or implications, omission of important information, and sensationalism (Cohen, 1997; Frost, Frank, & Maibach, 1997; Gregory & Miller, 1998; MacDonald, 2005; Moyer, Greener, Beauvais, & Salovey, 1995; Ransohoff & Ransohoff, 2001; Wilkes, 1997). For example, Cohen (1997) was concerned that popular media's extensive attention to research progress regarding AIDS may have encouraged false or excessive hope and unrealistic expectations for AIDS cures. Huge media praise for progress in medical research was likely to overshadow the limitations and/or conditional effects of research outcomes, which were often simplified in the media platform (Cohen, 1997). Additionally, scholars were worried about broadcast journalists' focus on such criteria as public appeal and visual supplements, and argued that these may hinder important health topics (Prabhu et al., 1996).

While both opportunities and challenges of reporting medical advances exist, coverage of medical advances in national and local television health news has increased over the past few decades (Brodie et al., 2003; Wilkes, 1997). The proliferation of this type of news story is closely related to the active public relations efforts of individual scientists/medical doctors, scientific communities, scientific journals, and research organizations (e.g., universities, hospitals, research institutions) to assist journalists' news production by providing news releases, press conferences, and credible expert sources

9

(Wilkes, 1997). The efforts to promote their achievements are intensified as public and private research funding becomes highly competitive, and as they recognize the importance of public attention and favorable image for procuring research funding (Wilkes, 1997). Under these circumstances, mass media are seen as an effective tool for reaching a large and wide population (Nelkin, 1995; Tanner, 2004).

The increase in health and medical news about medical advances has also resulted from journalists' need to gather news items with limited time and resources (Entwistle, 1995; Tanner, 2004). Research articles published in medical journals and information subsidies from related organizations (e.g., press releases) are handy resources for health journalists to initiate and develop news story ideas within a time constraint (Entwistle, 1995). Medical journals and researchers are essential sources for a wide range of health information, including "the latest biomedical discoveries, clinical therapies, health updates, scientific research, and technological innovations" (Chew et al., 2006, p. 311). Entwistle (1995) showed that major British news organizations routinely monitor prestigious medical journals, such as the *British Medical Journal* and *The Lancet*, for potential news stories, and frequently write stories about the research published in the journals. As a result, the vast majority of medical news stories in major British newspapers appeared to be directly from the two medical journals or from the journals' press releases (Entwistle, 1995). On average, British newspapers published 1.25 news articles from the two medical journals per week (Entwistle, 1995).

A national survey of health and medical science journalists in the U.S. also highlighted their heavy reliance on news releases and scientific journals when selecting news items (Viswanath et al., 2008). In particular, the preference among journalists in

national (64.6%) and broadcast news media (46.0%) for relying on scientific journals was substantially higher than those in local (29.9%) and print news media (25.1%), respectively. Scientists from academic institutions were regarded as highly credible news sources, especially by journalists working for broadcast news media. The use of press releases from related research organizations was dominant regardless of geographic scope and type of medium (53.5% for national; 41.9% for local, 41.1% for print; and 47.8% for broadcast news medium).

In another national survey of health reporters working at local television stations, about half of respondents reported that press releases and public relations persons with personal contacts were the two most frequent sources for news story ideas, while about 20% of them regarded medical journals as a story idea source (Tanner, 2004). Entwistle (1995) noted that, for reporting on research articles, health journalists tend to have a strong trust in research findings from peer reviewed journals, and do not usually find a second opinion or an opposing view from another expert in the area. From such over-reliance on information sources, scholars speculated that journalists lack knowledge about sophisticated technical/scientific information and its social/scientific implications or that there is a knowledge imbalance between journalists and expert sources (Andsager & Powers, 1999; Corbett & Mori, 1999; Entwistle, 1995; Tanner, 2004). Given the close source-journalist connection in the health and medicine domain, it is logical to observe that television news is likely to portray medical issues in a positive manner (Miller, Augenbraun, Schulhof, & Kimmel, 2006; Miller & Kimmel, 2001; Priest, 1990). A critical concern in this regard is that such a symbiotic relationship between journalists and information sources may influence what and how news stories are created

(Viswanath et al., 2008). More importantly, the way a news story is constructed (i.e., news frame) can serve as a "key heuristic" for audiences to understand the scientific issue and shape their attitudes toward it (Liu & Priest, 2009). The following section further addresses how this may happen in the realm of news coverage of medical advances based on framing theory, which demonstrates how news items are selected and created by journalists, and how varied presentations (or frames) of health issues in news stories may affect audiences.

Framing theory

According to Entman (1993), framing is the way in which news is constructed through selection and salience of certain information. Reality is constructed through news by selecting and emphasizing specific aspects of issues while ignoring other aspects. In other words, a frame is "a central organizing idea or story line that provides meaning to an unfolding strip of events, weaving a connection among them" (Gamson & Modigliani, 1987, p. 143). Thus, news frames serve to (a) define problems, (b) identify causes of the problem or provide causal interpretation, (c) evaluate morality of the causal relationship, and (d) provide recommendations for the problems (Entman, 1993). Technically, a specific frame may be embedded in news by selecting certain words or phrases, stereotypical images, and sources of information, and/or by highlighting certain facts, judgments/evaluations, and perspectives (Entman, 1993).

For example, Iyengar (1991) differentiated a thematic frame from an episodic frame. According to Iyengar (1991), an episodic frame focuses on a specific and concrete event and often engages with individual-level examples, which incite individual-level

12

problem definitions and solutions. On the other hand, a thematic frame focuses on an overall issue rather than on a single event, and analyzes the issue in a broader and more abstract social context. The causes and solutions are therefore identified at a societal/systemic level in thematically framed news stories. Iyengar (1991) argued that television news tends to focus on an individualistic angle (i.e., episodic frame) as opposed to a societal/systemic angle (i.e., thematic frame). In terms of health issues, previous studies have showed dominance of episodic frames in news coverage (Cho, 2006; Mastin, Choi, Barboza, & Post, 2007). For example, consistent with Iyengar's (1991) argument, Cho (2006) showed that 75.6% of network news coverage of breast cancer aired from 1974 to 2003 was episodically framed.

Because of the highlighting of certain aspects and ignorance of others, the framing literature argues that the individuals who view the world through the media frame are likely to perceive the issue from the same viewpoint. This contention is logical because certain information becomes more "noticeable, meaningful, or memorable to audiences" through the news frame, and audiences are likely to understand the problem, construct meaning of the problem, and evaluate the problem based on the information they collected from the news (Entman, 1993, p. 53). Entman (1993) argued that news frames may lead the audience's attention to the aspects that the news emphasizes, and distract their attention from other aspects (Entman, 1993). Thus, both omission and inclusion of any information regarding the problem (e.g., definition, interpretation, evaluation, and solution) are equally critical for shaping audiences' mindset (Edelman, 1993; Entman, 1993).

The notion of frame-setting refers to the link between media frames and audience frames (Scheufele, 2000). According to Pan and Kosicki (1993), the relationship between the media frame and the audience frame is part of the news media discourse process; news frames activate or restrict certain constructs of the issue and audiences interpret and construct the meaning of the issue from the activated constructs. Because the constructs activated by media frames are readily accessible and available in the audiences' cognitive processes, they are more likely to be referred to in the audiences' subsequent judgments (De Vreese, 2004; Pan & Kosicki, 1993; Price, Tewksbury, & Powers, 1997).

Scheufele (2000) summarized that scholars have tested the frame-setting effect in two ways. The first group of scholars (e.g.,Yanovitzky & Blitz, 2000; Zhou & Moy, 2007) employed a combination of news content analysis and public opinion survey in order to examine the transfer of media frames to audience frames in aggregation. On the other hand, the second group of scholars used an experiment to examine the effect of manipulated news frames on individual news processing. This study follows the second line of research, which includes Iyengar (1991), Price et al. (1997), and Gross (2008). For instance, Price et al. (1997) tested how three news frames (conflict, human interest, and consequence) of news reports regarding a state funding cut for a university affected an individual's cognitive process, particularly activation of thoughts. The result showed that audiences came up with more thoughts that corresponded to the specific aspects stimulated by each news frame (Price et al., 1997). Iyengar (1991) also argued that news frames (e.g., episodic vs. thematic) may shape an individual's perception of who is responsible for an issue. Because the episodic frame emphasizes a single event and highlights the causes and solutions at an individual level, audiences who view episodic

news stories tend to assign responsibility to individuals rather than to society (Iyengar, 1991). In the context of public health, Jeong (2007) found that news frames (i.e., behavior-based explanation vs. gene-based explanation) in newspaper coverage of obesity were transferred to audiences' causal attribution of obesity, particularly among those who perceived low controllability over their health. In sum, to a certain extent, how news is presented affects how audiences perceive the issue in a parallel manner.

Human interest framing in news coverage of medical advances

According to previous literature, a human interest frame is defined as a news frame with "a human face and emotional angle" to present an event, issue, or problem (Cho & Gower, 2006, p. 420). More specifically, Luther and Xiang (2005) defined it as a news frame in which "individual lives are featured to personalize the story, with affective dimensions accentuated" (pp. 859-860). In the context of science/technology, health, and environment, Leon (2008) defined the human interest angle as including "compelling stories about people's lives or challenges" (p. 449). This specific angle is different from the public impact/significance angle, which focuses on "a large number of people being affected" (Leon, 2008). For example, if a news story states that a new pill effectively treats diabetes, from which millions of patients are suffering in the U.S., that story can be said to emphasize public impact. On the other hand, a news story with a human interest angle may demonstrate that a 46-year-old named Michael, who has suffered severely from diabetes for several years and who lives in poverty, can survive with the new treatment. Although Leon (2008) focused primarily on verbal cues in his analysis of newspaper coverage, news frames can also be created by other tools such as selection of

15

sources and visual images (Entman, 2003). For example, in television news, a camera shot of Michael's suffering or an emotionally charged interview with Michael can provide a unique angle for the issue.

For health and medical journalists, the human interest frame involves including personalized stories of real people in news stories (Hinnant & Len-Rios, 2009). For journalists in broadcast media, the ability to provide a human interest angle (89.9%) was one of the top three criteria for pursuing a news story, along with the potential for public impact (98.2%) and the new information or development itself (92.4%) (Viswanath et al., 2008). Correspondingly, MacDonald (2005) presented that journalistic writing, as opposed to scientific/academic writing, used nouns and verbs involving human actors, which put more human interest angle in news stories about scientific research. Health reporters strongly believe that a human interest element is necessary for making complex information understandable to lay audiences (Hinnant & Len-Rios, 2009; MacDonald, 2005). A survey of health journalists showed that providing a human element (e.g., an individual with a health problem) in health news was regarded as more effective in enhancing audiences' understanding of medical information than any other journalistic tool, such as visual supplements (e.g., photos, illustrations), conversational tone, and linguistic device (e.g., metaphors, analogies) (Hinnant & Len-Rios, 2009).

Particularly for health journalists working at local television news organizations, the human interest frame seems to be more respected in the practice of news production. Tanner (2004) showed that 92% of health journalists at local television stations consider the ability to humanize a topic as one of the two most influential factors when they decide

whether or not to write a news story.[3] This factor far outweighed other influences, such as resource availability, visual supplements, and sponsorships (Tanner, 2004). As for press releases, 90% of health journalists at local television stations indicated that stories providing humanization or human interest elements (i.e., personal examples) enjoy the best chance of being broadcast (Tanner, 2004). Thus, employing human interest framing strategy in press releases turned out to best satisfy journalists' needs, although other strategies such as providing videos and/or sound bites and explaining technical information work to some extent (Tanner, 2004).

In this respect, Nisbet and Mooney (2007) argued that scientists who want attention from journalists should frame their research in such a way that a wide range of audiences are able to perceive personal relevance and understand its complexity. Similarly, Viswanath et al. (2008) recommended that medical scientists and public relations practitioners provide human interest angles of their research in addition to data-based information. Beyond translating medical or scientific jargon, making news stories more personally relevant to audiences is a key to overcoming the lack of public attention to this type of news (Brodie et al., 2003). Human interest framing, which employs a personalized example, is widely believed to be a promising way to achieve these missions simultaneously. For example, Brodie et al. (2003) demonstrated that audiences paid more extensive attention to health/medical news stories with a human interest element.

Based on previous literature and journalistic convention, this study defines a human interest frame as a news presentation that provides a human angle or emotion by employing a human exemplar (or personalized exemplification) and his/her personal

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[3] The other important factor was audience interest in a topic, which was reported by 94% of respondents.

story in reporting the event. In reporting medical advances in television news, specifically, a human interest frame visibly presents one or more individual patients and their family, and incorporates personal anecdotes of their lives and experiences associated with the medical event into the news story.[4] Human interest frames are frequently used in coverage of diverse issues involving health and medicine, and are highly prevalent both in U.S. and international news coverage (e.g., Cho, 2006; Luther & Xiang, 2005). Thus, it is prudent to examine the possible influence of the human interest frame on audiences.

From a survey of health journalists, Hinnant and Len-Rios (2009) noted that using a human interest element in health news stories may have potential advantages in "adding interest and appeal, helping readers identify with a problem, reducing stigma, and grounding the learning" (p. 104). McDonald (2005) also said that because audiences of popular news outlets (e.g., network television news) are neither motivated nor self-selected for consuming scientific information (compared to readers of scientific and science-focused journals), some elements of "simplification, vividness, or entertainment" are expected in delivering scientific information (p. 278). Human interest framing is a way for journalists to meet such expectations.

On the other hand, one potential problem is that such journalistic convention may exaggerate dramatized and emotional portrayals of scientific research and overshadow validity and quality of the scientific research in terms of methods, limitations, implications, and so on (MacDonald, 2005). Human interest framing of medical advances, in this respect, makes the event more human-oriented and emotion-appealing while it

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[4] This study focuses on the human interest angle only from the patient's point of view, although news stories occasionally include an anecdote from the researcher's side; for example, addressing the challenges they encountered during the research such as a lack of funding or a number of failures over the years, or their motivation, such as loss of a family member due to a specific disease.

prevents critical judgment about the validity of the event (MacDonald, 2005). Cho and Gower's (2006) study showed a possibility of human interest framing inducing stronger emotional responses from audiences, such as empathy with victims, and greater attribution of blame and responsibility to the organization surrounding a corporate crisis situation.

Additionally, Luther and Xiang (2005) were concerned about the possibility of human interest frames distracting public attention from substantive central issues due to overemphasis on personalized and emotional aspects of the issue. Likewise, Jensen et al. (2010) argued that human interest framed stories or personalization of news stories might have attributed to journalistic bias or distortion in cancer news reporting by focusing on a single person's experience. They noted that the potential impact of distortion might be even greater if the person is a celebrity who draws substantial public attention (Jensen et al., 2010). For instance, a celebrity with a specific type of cancer makes that type of cancer stand out while making other types inconspicuous (Jensen et al., 2010). They argued that wide public awareness of breast cancer might have resulted from intensive news coverage of both famous and non-famous individuals with breast cancer, whom breast cancer organizations used for publicity (Jensen et al., 2010).

Therefore, there seem to be both opportunities and challenges associated with reporting medical advances in a human interest frame. On one hand, scholars reported concerns about negative responses (e.g., sensationalism) to news stories with human interest angles (MacDonald, 2005; Nelkin, 1996; Ransohoff & Ransohoff, 2001). Nevertheless, it is still a major journalistic technique that makes news stories more relevant and interesting to audiences, which in turn increases audiences' readability and

attention to the issue and helps them engage more with the news story (Brodie et al., 2003; Sotirovic, 2003; Viswanath et al., 2008).

Thus, this study proposes hypotheses to examine this matter from the audiences' perspective – how they feel about and perceive human interest framed news stories compared to non-human interest framed news stories. Specifically, this study asks whether or not human interest framing successfully achieves its objectives to involve audiences in the news story, to improve positive news evaluation, and to help comprehension of news content.

H1: News stories about medical advances in a human interest frame will lead to greater audience involvement in the news stories than those in a non-human interest frame.
H2a: News stories about medical advances in a human interest frame will lead to more favorable evaluation about the news stories than those in a non-human interest frame.
H2b: News stories about medical advances in a human interest frame will lead to greater audience understanding of health content than those in a non-human interest frame.

In order to further explicate the potential impact of the human interest frame in health news, this study introduces exemplification theory (Zillmann, 1999; Zillmann & Brosius, 2000).

Exemplification theory

Exemplification theory (Zillmann, 1999; Zillmann & Brosius, 2000) compares two types of presentation styles for articulating a trend or phenomenon in a message. One

style provides specific examples (or exemplars) of a case to exemplify the broad phenomenon. The exemplar contrasts with base-rate information, which illustrates a more abstract and summary type of description of the phenomenon. In television news, exemplification often conveys the interviewer's dramatic anecdote and emotional reaction though facial and verbal expressions, which consist of important visual components using close-up camera shots (Aust & Zillmann, 1996).

Exemplification theory highlights the disproportionate influence of these two types of presentations on audiences' perceptions of issues (Zillmann, 1999, 2006; Zillmann & Brosius, 2000). When an exemplar was used in news stories, it appeared to have a stronger influence on audiences' beliefs and judgments about the described issue than base-rate information. Even when the exemplar was not consistent with the overall quantified trend indicated in the message, exemplification dominated formal quantification of the events or population in terms of individual perceptions of the event (e.g., Brosius & Bathelt, 1994; Zillmann, 2006). Exemplification theory contends that such a powerful impact of exemplars results from their vivid and concrete nature, and their power to instigate emotional responses (Brosius & Bathelt, 1994; Zillmann, 2006; Zillmann & Brosius, 2000).

Psychologically, exemplification theory was built on heuristics of information processing, which involves two types of cognitive shortcuts: representative heuristic and availability heuristic (Zillmann, 1999; Zillmann & Brosius, 2000). Individuals tend to perceive an exemplar in a message (e.g., television news) as representative of a larger group. The representativeness of the exemplar in regard to the entire population is not always considered under the actual population size or probability/frequency of the

exemplar's occurrence. This means that exemplification may mislead one's perception of the overall phenomenon involving the exemplar. On the other hand, availability heuristic concerns how likely the exemplar is to be activated in one's memory. When the exemplar is available in memory, it is more likely to be retrieved to make decisions. Moreover, the accessibility of the exemplar becomes greater through repeated and/or recent exposures, and the ease of bringing the exemplar to mind determines subsequent perceptions and judgments pertinent to the exemplar and the larger population (Zillmann, 1999; Zillmann & Brosius, 2000).

Regarding issues pertaining to safety and health in particular, exposure to exemplars led audiences to greater risk assessment and avoidance and a greater tendency to engage in protective behaviors (Zillmann, 2006; Zillmann & Brosius, 2000). In particular, emotion-provoking exemplars were more powerful for causing audiences to pay more attention to the message and to estimate a greater prevalence and severity of health threats (Aust & Zillmann, 1996; Zillmann, 2006; Zillmann & Brosius, 2000; Zillmann & Gan, 1996). For example, Aust and Zillmann (1996) found that, for health-related news stories such as food poisoning and handgun violence, audiences perceived a greater severity of the problem and a greater risk of being victimized when the news story contained victim exemplification. The impact was even greater when the exemplification expressed greater emotions. They argued that such exemplifications "serve to maintain viewer interest because of their vividness, and they can add insight about possible causal circumstances and the likely impact of the events" (Aust & Zillmann, 1996, p. 788).

Relying on this theory, exemplars in health news may contribute to audiences' representative heuristics and availability heuristics in processing information about a new

medical advance. In other words, when a patient is presented as an exemplar, this triggers audiences to perceive that s/he is representing a large population with a specific disease or adverse condition. In news stories containing a new medical development, exemplars are usually people who could benefit from it, and thus, audiences of these news stories are likely to perceive great benefits from the medical progress because the exemplar is perceived to be representing a larger population of future beneficiaries. Likewise, presence of an exemplar and his/her emotion expressed via verbal and facial cues contribute to easier access to the benefit of the depicted medical advance in an individual's mind. Because the benefit of the specific exemplar is available and readily accessible in audiences' memories through the exemplar, the news content could be easily used when making relevant judgments. For example, an exemplar may lead audiences to perceive a higher importance of the described medical advance by making the relevant population of patients more activated in their mind.

Besides an exemplar's frequency and recency, vividness and salience are also known to affect impact (Zillmann, 1999; Zillmann & Brosius, 2000). Vivid messages are better recalled and remembered than pallid messages, and the information is more available and accessible in the audience's cognitive processes because audiences are more emotionally involved in and attentive to vivid messages (Nisbett & Ross, 1980; Taylor & Thompson, 1982; Zillmann & Brosius, 2000). Taylor and Thompson (1982) conceptualized the three elements of a message's vividness as: (a) concrete and specific language, (b) visual supplements (e.g., picture or videotape), and (c) an anecdotal storytelling of personal history. Messages with these vivid elements are known to have a stronger power to affect the audience's judgment (Brosius & Bathelt, 1994; Taylor &

Thompson, 1982; Zillmann & Brosius, 2000). At this point, it is noteworthy that human exemplars who are used in human interest framed health news in television mostly include these elements, especially visual representation and personal testimonials, while being depicted in the news reports, and this may highly affect audiences' perceptions of the issue, according to previous arguments. In television news about medical advances, exemplified patients provide audiences with a chance to share their story about personal experience regarding the benefit of the advance, and this is a major component of news stories about medical advances. Scholars argued that such a personal anecdote/ testimonial is a narrative form of message, which enjoys greater persuasive power than a statistical format because it elicits emotional responses among audiences (e.g., Dunlop, Wakefield, & Kashima, 2008) and it is more memorable (e.g., Reinard, 1988).

Based on the aforementioned literature, how individuals perceive the specific medical advance depicted in a news story is presumably influenced by news frame (i.e., whether or not the news story employs exemplars and their anecdotes). This study expects greater positive impact of news stories presented in a human interest frame, as opposed to a non-human interest frame, on individual perceptions of medical advance/research described in the news stories.

H3: News stories about medical advances presented in a human interest frame will lead to more positive perceptions of the described medical advance/research than those in a non-human interest frame.

In discussing the persuasive effect of health news, previous studies elucidated the influence of news media on individuals' healthy behaviors beyond their health knowledge and attitudes in context of diverse health issues, such as AIDS (Snyder & Rouse, 1995), cardiovascular diseases and diabetes (Brannstrom & Lindblad, 1994), and cancer (Niederdeppe et al., 2008; Stryker et al., 2008; Yanovitzky & Blitz, 2000). However, this study questions whether the news stories about a medical development can also work for promoting healthy behaviors. It is plausible that optimistic expectation for medical development, which is encouraged by a news report, prevents individuals from actively engaging in healthy behaviors. On the other hand, it is also feasible that exposure to medical issues through television news increases overall awareness of health and encourages healthy behaviors at an individual level. Because both directions are possible, the current study proposes a research question about how medical progress stories either in a human interest frame or in a non-human interest frame would affect audiences' perceptions of individual healthy behaviors.

RQ1: In reporting medical advances, is there any difference between the two news frames (i.e., a human interest frame vs. a non-human interest frame) on the influence of audiences' perceptions of individual healthy behaviors?

This study also examines the potential mediating role of audience involvement in the impact of news frames in terms of news evaluation, comprehension of health content, and perceptions of described medical advances/research and individual healthy behaviors. Audience involvement with a news story is defined as the magnitude of an individual's

cognitive and affective investment in the story (Slater & Rouner, 2002) and the intensity of mental absorption in and arousal by the story (Smith, Downs, & Witte, 2007, p. 136). In the same sense, Green and colleagues introduced the concept of "transportation" (Green & Brock, 2000; Green, Garst, & Brock, 2004). By being transported into a story, audiences are "cognitively and emotionally involved in the story and may experience vivid mental images tied to the story's plot" (Green et al., 2004, p. 168). The terms "audience involvement," "absorption," and "transportation" all indicate the same concept of audience experience with a message (Slater & Rouner, 2002). Slater and Rouner (2002) argued that the amount of audience involvement in a story is distinct from the involvement in or personal relevance to the topic *per se*, and the former could be more powerful than the latter (Slater & Rouner, 2002).

Previous studies articulated that viewers who are more deeply drawn into the stories are likely to be influenced by them (Green, et al., 2004), and that long-term exposure (e.g., drama in a serial format) provides greater opportunities for those influences (Slater & Rouner, 2002). Specifically, the more individuals are absorbed in a story, the less critically they process the information, which prevents them from generating counterarguments and encourages story-consistent beliefs, values, and attitudes (e.g., Green & Brock, 2000; Nabi & Krcmar, 2004; Slater & Rouner, 2002). Thus, increased involvement in the story could be influential even for people with counter-attitudes toward the presented issue (Slater & Rounder, 2002).

Previously, the concept of audience involvement in messages has been considered in terms of fictional serial dramas (e.g., Slater & Rouner, 2002; Smith et al., 2007), rather than news content. However, audience involvement is critical in processing television

news because the degree to which audiences are involved/engaged in and attentive to the news is a foundation of learning information from the news, regardless of the audience's interest in the topic or cognitive ability (Brodie et al., 2003). In this regard, this study expects that those who are more involved in health news stories endorse positive beliefs in and attitudes toward medical advances/research more strongly, consistent with the positive portrayals of medical advances/research provided in the news (e.g., "this is an impressive progress in medical science," "this breakthrough will help a substantial portion of the population"), while negative beliefs in and attitudes toward medical advances/research are suppressed. Likewise, this study presumes that level of audience involvement in the news plays a role in the effects of news frames on the potential consequences proposed earlier in this section. Therefore, the next hypothesis proposes the mediating role of involvement in the influence of news frames on audience responses as follows:

H4: The level of audience involvement in the news story will mediate the influence of news frames on their news evaluation, perceived understandability of news stories, and perceptions of medical advances/research and individual healthy behaviors.

Emotion in news information processing

Another area worth investigating is the interplay of emotional responses in individual processing of health news. Dunlop et al. (2008) proposed a model explaining the influence of emotional responses in health communications, and identified three classes of emotions associated with health-related messages: self-referent, plot-referent,

and message-referent emotional response. Self-referent response refers to the emotion caused by thoughts about one's life and self that are stimulated by the message. Plot-referent response refers to the emotion experienced in relation to a character or to a situation. Lastly, message-referent response is the immediate response to the message itself, such as visual images and information sources in the message. Dunlop et al. (2008) argued that emotions, induced by a combination of these routes, directly or indirectly influence the perception of the issue and subsequent behaviors.

By examining audiences' responses to different political news frames, Gross and colleagues highlighted the importance of understanding their emotions, such as pity, sympathy, anger, fear, and relief (Gross, 2008; Gross & D'Ambrosio, 2004). For example, on the topic of mandatory minimum sentencing, different presentation styles (e.g., episodic vs. thematic frame, white vs. black exemplar) generated different emotional reactions, which in turn led to differences in audience opinion about policy support or opposition (Gross, 2008). Nabi (2003) showed that discrete emotions experienced while processing a news message affects information accessibility and, subsequently, information seeking and judgment about an issue. Specifically, regarding the issue of drunk driving, individual-focused causal attribution and a retributive solution were more accessible in anger-primed participants whereas societal attribution and protection-based solutions were more accessible in fear-primed participants (Nabi, 2003). The judgment of the two groups differed correspondingly; the fear-primed group preferred protection-based initiatives more than the anger-primed group (Nabi, 2003). Thus, Nabi (2003) argued that the way information is presented in news (i.e., news frames) influences how people interpret a problem/issue and make a corresponding decision, and that how they

28

feel (i.e., emotions) affects the equivalent mental processes, such as information gathering, memory, and judgment. In this regard, Nabi (2003) asserted "the notion of emotions as frames" (Nabi, 2003, p. 226).

Exemplification theory also focuses on audiences' affective reactivity to exemplars, which, in turn, affects further information processing of the message (Aust & Zillmann, 1996; Zillmann, 2006; Zillmann & Brosius, 2000). In the context of safety and health, exemplars have almost always been used to exemplify the affected via threatening imagery (e.g., victims, disgusting physical symptoms), and therefore often induce negative emotions, such as fear and anxiety. The negative affective response as a result of scary or aversive image-laden exemplars led audiences to feel stronger fear, to estimate a higher likelihood of encountering adverse events/health threats, and to act upon protective behaviors (Zillmann, 2006; Zillmann & Brosius, 2000). Emotion-provoking exemplars were also more powerful in drawing greater audience attention to the message (Aust & Zillmann, 1996; Zillmann, 2006; Zillmann & Brosius, 2000; Zillmann & Gan, 1996). Thus, the effects of exemplars appeared to be considerable in news consumption, at least partially through emotional responses of audiences (Zillmann, 1999; Zillmann & Brosius, 2000).

Since many health issues are directly related to one's well-being and quality of life, the impact of emotion can be substantial and should be taken into account in health news processing. Moreover, the role of emotion should be examined because news stories about medical advances have been known to be vulnerable to sensationalism (MacDonald, 2005; Nelkin, 1998; Ransohoff & Ransohoff, 2001) and emotion-provocation (Cohen, 1997; Danovaro-Holliday, Wood, & LeBaron, 2002; Gwyn, 1999). In contrast to other

health messages appealing to negative emotions (e.g., fear, anger), news stories about medical advances tend to emphasize the positive aspects. The tone of these news stories is promising, and the exemplified patient is described as a lucky beneficiary rather than an unfortunate victim. Ransohoff and Ransohoff (2001) called this trend of presenting medical advances the "breakthrough syndrome" (p. 186). Therefore, this study attempts to probe the impact of news frames under positive presentations of health issues. This study expects such emotional impact to be greater for news stories presented in a human interest frame, compared to a non-human interest frame. The following set of hypotheses posits that news stories about medical progress presented in a human interest frame will intensify positive emotions, such as hope and relief, while suppressing negative ones, such as fear and anger.

Additionally, the current study attempts to examine how aggravated or diminished discrete emotions play a role in the overall cognitive process and consequences of news stories about medical progress. Specifically, this study examines if audiences' emotions mediate the effect of news frames on individuals' responses to the news story.

H5a: News stories about medical advances presented in a human interest frame will lead to higher levels of positive emotions than those presented in a non-human interest frame. H5b: News stories about medical advances presented in a human interest frame will lead to lower levels of negative emotions than those presented in a non-human interest frame. RQ2: If any, how does the emotion experienced by audiences mediate the influence of news frames on news evaluation, perceived understandability of news stories, perceptions of described medical advance/research, and individual healthy behaviors?

The role of identification

Although the underlying mechanism of exemplification theory has been studied substantially, the way exemplars work in audiences' message processing has not been deeply investigated empirically. The current study presumes that the degree to which an individual identifies with the displayed exemplar in a news story may affect his/her responses to and consequences of the news story.

The concept of identification mostly has been applied to drama narratives (e.g., drama theory by Kincaid, 2002), but seems highly applicable to news stories presented in a human interest frame, which employs human exemplars. Without a doubt, television news stories are different from television serial dramas in certain aspects. For instance, news stories and their associated human exemplars are real, and the length of the news story (and subsequent duration of identification) is relatively short compared to that of the serial drama. Unlike serial dramas, however, the repeated experience of identification with the same exemplar is not possible. Nevertheless, the current study emphasizes the narrative storytelling of exemplars in a human interest framed news story. Not only is a person (or exemplar) simply presented as an example of the event, but the news story also includes anecdotes about the person's experience or history surrounding the event. For instance, the news story may address what kind of problem an exemplar had and how the event changed his/her life and his/her family's life. Such personal narratives of lived experiences help audiences "make sense of actions, motives, and consequences, as well as interactions, relationships, and emotions," which may encourage a short-term identification with the exemplar (Gray, 2009, p. 259).

31

In the current study, identification refers to an audience's experience of emotional engagement with and attachment to the person in the news story (i.e., an exemplar) while processing news content. The relationship can be built in several ways. For example, Slater and Rouner (2002) defined identification with televised characters as "experienced similarity to those characters, or even parasocial relationship with those characters" (p. 177). Perceived similarity refers to the degree to which an audience perceives themselves as being similar to a character. Perceived similarity may be associated with consideration of demographic characteristics and previous experiences. On the other hand, parasocial interaction is defined as "a perceived relationship of friendship or intimacy" by an audience with a television character (Sood, 2002, p. 156). Moreover, Slater and Rouner (2002) did not neglect emotional sharing with the characters (i.e., empathy) as a part of identification; they argued that sharing emotional responses as well as external similarities or homophily is a key way of identifying with characters.

Escalas and Stern (2003) articulated the conceptual difference between sympathy and empathy by pointing out that the two concepts have been blurred and used almost interchangeably in previous research. Escalas and Stern (2003) argued that the two concepts are interconnected emotional responses but still differ from each other. According to Escalas and Stern (2003), empathy refers to the audience's sharing of and absorption in a character's feeling, whereas sympathy focuses on the audience's recognition or awareness of a character's feeling and/or situation. In other words, sympathy occurs as people stay self-conscious and detached from the character/situation, while empathy occurs when they are totally absorbed in the character's feeling/situation and lose themselves emotionally (Escalas & Stern, 2003). In this respect, they

summarized sympathy as "with-feeling" and empathy as "in-feeling." Escalas and Stern (2003) applied these two concepts – sympathy and empathy – to the consumption of drama-type advertisements, and found that both sympathy and empathy demonstrated direct effects on positive attitudes toward advertisements. Escalas and Stern (2003) highlighted that people tend to recognize the feeling of a character and situation first (i.e., sympathy), then move to sharing the feeling (i.e., empathy). In sum, based on the aforementioned literature, this study conceptualizes identification as being composed of four elements: similarity, sympathy, empathy, and parasocial interaction.

Previous studies on identification in other message settings (e.g., entertainment-education programs) showed that the impact of the messages was likely to increase when audiences identified with the characters in the storyline (Smith et al., 2007). Additionally, the level of identification tended correlate with audience involvement in the stories, which consequently influenced the impact of the stories (Slater & Rouner, 2002). Likewise, the current study suggests that audience identification with an exemplar affects audience involvement on other outcomes (e.g., news evaluation, perceptions of described medical advance/research). The following hypotheses propose that the increased audience involvement in human interest framed news stories and subsequent outcomes happen, in fact, through identifying with an exemplar in the news stories. By exploring this, the current study expects to clarify the internal mechanism regarding the impact of a human interest frame.

H6: While watching a human interest framed news story about medical advances, the influence of audience involvement in the news story will be mediated by the degree to which audiences identify with an exemplar in a news story.

H6a: The level of audience identification with an exemplar in a news story will mediate the influence of audience involvement on the news evaluation.

H6b: The level of audience identification with an exemplar in a news story will mediate the influence of audience involvement on the perceived understandability of health information.

H6c: The level of audience identification with an exemplar in a news story will mediate the influence of audience involvement on the perceptions of medical advances/research described in the news story.

H6d: The level of audience identification with an exemplar in a news story will mediate the influence of audience involvement on the perceptions of individual healthy behaviors.

H6e: The level of audience identification with an exemplar in a news story will mediate the influence of audience involvement on the intensity of emotional reactions.

Health consciousness: Individual differences in health information processing

In understanding individual information processing of health-related messages, individual differences should be considered as well. Among many individual properties, for example, previous studies showed that individuals' tendencies to be empathetic to other people predicted how audiences perceive the human exemplars in news stories (Aust & Zillmann, 1996), and one's thinking style (e.g., rational-analytic vs. experiential-

intuitive) influenced the effect of different message frames (Shiloh, Salton, & Sharabi, 2002). Individuals' arithmetic aptitude successfully predicted their information processing and memory of news reports containing a numeric quantity of events (Zillmann, Callison, & Gibson, 2009). In addition, pre-existing attitudes toward the issue of alcohol use was found to be an important indicator of responses to different presentation styles of alcohol education messages (e.g., exemplification) (Slater & Rouner, 1996). Only when the message was value-discrepant, as opposed to value-congruent, were messages containing an exemplification of anecdotal evidence perceived more positively, probably through the peripheral route of information processing (Slater & Rouner, 1996).

This study proposes level of health consciousness as a focal individual trait in terms of one's response to television health news. Previous studies have shown that health consciousness is a significant predictor of a variety of health-related attitudes and behaviors (Furnham & Forey, 1994; Gould, 1988, 1990; Iversen & Kraft, 2006; Jayanti & Burns, 1998; Michaelidou & Hassan, 2008). For example, health-conscious individuals are known to engage more in health-promoting behaviors, such as healthy diet and exercise (e.g., Iversen, & Kraft, 2006).

Hong (in press) recently defined health consciousness as a psychological disposition regarding "a comprehensive mental orientation toward health, consisting of self-health awareness, personal responsibility for one's health, and health motivation" (See Hong, in press, for extensive review). In other words, health-conscious individuals are more likely to "be attentive to their health conditions, perceive personal responsibility for their health, and be motivated to maintain good health" (Hong, in press). Hong (in

35

press) argued that health consciousness is a relatively stable psychological attribute, although she did not overlook the possibility of changes depending on individual or social/environmental circumstances.

In the current study, the importance of health consciousness lies in its substantial role in relation to individuals' health information, such as information seeking and processing (Basu & Dutta, 2008; Dutta-Bergman, 2004, 2005, 2006; Dutta, 2007; Dutta & Feng, 2007; Iversen & Kraft, 2006; Kaskutas & Greenfield, 1997). Individuals' attention and interest in health information are considerably associated with their level of health consciousness (Hong, 2009). People with high health consciousness are likely to pursue health information from diverse interpersonal (e.g., a doctor, non-expert acquaintance) and mediated sources (e.g., magazines, television) (Dutta-Bergman, 2005; Furnham & Forey, 1994; Gould, 1990; Kaskutas & Greenfield, 1997), and to better remember health information and actively incorporate it in their future behavior (Dutta-Bergman, 2006).

Specifically, Hong (in press) demonstrated how level of health consciousness affects individuals' information processing of television health news and message acceptance. The more conscious individuals are about health, the more likely they were to perceive severe health threats in response to the same television portrayals of health issues, such as a heart attack, STDs, and diabetes. Health-conscious individuals also perceived higher confidence in their ability to take healthy behaviors recommended by the news, higher effectiveness of suggested recommendations, and ultimately, had greater intentions of performing the recommendations as a result of television news exposure.

36

These properties of health-conscious individuals provide a rationale for examining the moderating effect of health consciousness in processing health news stories, particularly about new medical developments. Thus, this study posits a question about how level of health consciousness interplays with the overall process of health news about medical advances in either a human interest frame or a non-human interest frame. Based on previous literature, this study speculates that level of health consciousness is positively associated with overall involvement in health news about medical advances. However, the interaction with news frames is uncertain at this point. One possibility is that if exemplification in the news is considered as a peripheral cue as stated in the Elaboration Likelihood Model (Petty & Cacioppo, 1984), it may not have a strong impact on health-conscious individuals who have a strong personal interest in health topics, compared to those who are not health-conscious. This is so because individuals with high health consciousness are likely to employ a central processing strategy, which enables a thorough processing of information regardless of the presence or absence of such a peripheral cue. On the other hand, those with low health consciousness may engage in a peripheral or heuristic information processing strategy, and thus tend to be affected by vivid cues such as exemplars used in a human interest frame.

However, previously identified characteristics of health-conscious individuals, from greater sensitivity to a health threat (Kraft & Goodell, 1993) and less skepticism about medical authority (Gould, 1988) to high self-awareness of one's health condition, high personal responsibility, and high health motivation (Hong, 2009, in press), may garner a much more complicated picture among the variables of this study with regard to

health consciousness. Therefore, the last set of research questions seeks to draw a comprehensive picture of health consciousness and other variables proposed earlier by examining its main effects, interaction effects with news frames, and conditional indirect effects (i.e., mediated moderation).

RQ3a: Is there a main effect of health consciousness on audience involvement in the news, news evaluation, perceived understandability of health information, and perceptions of described medical advances/research and individual healthy behaviors and emotional reactions?

RQ3b: If at all, how does one's health consciousness interact with news frames in the effects on audience involvement in the news, news evaluation, perceived understandability of health information, and perceptions of described medical advances/research and individual healthy behaviors and emotional reactions?

RQ3c: If at all, how does one's health consciousness moderate the indirect effects of news frames mediated by audience involvement in the news story?

RQ3d: If at all, how does one's health consciousness moderate the indirect effects of news frames mediated by audiences' emotional reactions to the news story?

CHAPTER 3

METHOD

Research design

This study employed a 2 (news frame: a human interest frame vs. a non-human interest frame) × 3 (health consciousness: low vs. medium vs. high) mixed experimental design. News frame was a manipulated-within factor, and health consciousness was a between factor, denoting a measure of individual differences. To reduce the uncontrolled effects of health messages, four news stories were used for each news frame condition. Considering participants' fatigue and other disadvantages of repeated measures (e.g., sensitization, learning effect), participants watched four news stories in the experiment. Each participant was exposed to two human interest framed news stories (out of four) and two non-human interest framed news stories (out of four). The order of news presentation was also varied in order to counter-balance uncontrolled effects stemming from the order effect. A total of eight subsets of news stories in different orders were generated. Participants were randomly assigned one of the eight subsets of four news stimuli.

News stimuli

News stimuli were drawn from a pool of local television health news stories that have been archived by the Health Communication Research Center at Missouri Journalism School. As of April 2010, the digitized motion capture system had recorded and stored approximately four hundred health news stories aired through two major local television channels in the Central Missouri area in 2009. Two local television channels are affiliated with major national television networks – ABC and NBC, respectively. The

39

archive contained evening/night news programs aired at 6:00 p.m. and 10:00 p.m. (CST). Recent news clips broadcasted in 2010 were also retrieved from the official websites of the two local television stations. Twenty-six health news stories about scientific advances in health and medicine were separated first from other health news topics, such as general health promotion (e.g., obesity prevention), incidents of diseases (e.g., H1N1), and health policy and law (e.g., health care reform). Some of the topics reported in this pool of news stories about medical advances included new or enhanced diagnosis/detection technology (e.g., CT scanner, colonoscopy, autism detection, Altzheimer test), innovative surgical procedures (e.g., stomach surgery technique for weight loss, spinal surgery), new disease cure/ treatment (e.g., infertility treatment using stem cells, treatment for tremors associated with Parkinson's disease, personalized cancer treatment), and identification of causes or underlying mechanisms of diseases or unhealthy conditions (e.g., ringing ear, melanoma, HPV, gene-based research on chronic diseases).

Afterwards, two graduate students grouped the stories into two categories: those with a human interest frame vs. those with a non-human interest frame. A non-human interest frame condition included news stories focusing on the factual information about the medical development with no personalized exemplification. News stories with a human interest frame included a personalized exemplification of the patient(s) or their family and interviews about their experience/history, as defined in the previous section. Agreement between the two students for the categorization of all news stories in the pool was 100%. As a result, four news stories about medical advances were classified as having human interest framing. All of the four news stories visibly presented a patient using close-up camera shots and incorporated his/her personal anecdote related to the

40

medical achievement. The selected news stories exemplified four patients of different demographics, which were appropriate to offer varied demographic representations of exemplars: a young female patient, a middle-aged female patient, a middle-aged male patient, and an elderly male patient.

Out of twenty-two news stories categorized in a non-human interest frame, four news stories were finally selected based on the roundtable discussion of three journalism graduate students with experience in television news production and/or visual communication. The three graduate students reviewed and evaluated the twenty-two news stories in terms of the length of the story and the amount and complexity of health information in the story, and selected four news stories that were most comparable with the four news stories selected for the human interest frame condition. Some of the selected news stories were edited slightly to control their length because news stories in a human interest frame tended to be much longer than those in a non-human interest frame, and the duration of a news story was highly correlated with the duration of exemplification. The length of the final editions of news stimuli ranged from 77 to 110 seconds (with an average of 90 seconds) for a human interest condition and from 36 to 83 seconds (with an average of 59.8 seconds) for a non-human interest condition. For the human interest frame condition, topics of the selected news stimuli were a CT scanner, a colonoscopy, a spine surgery technique, and a knee surgery technique. For the non-human interest frame condition, stories about an autism detection device, HPV research, a stomach surgery technique, and an electronic migraine reliever were selected (for sample transcripts of news stimuli, see Appendix A). Because this study used actual news reports that were casted through local television channels, respondents were asked if they

had already seen the selected news stories before the experiment. Previous exposure to the news stimuli was relatively low: twenty cases of previous exposure were reported out of 392 viewings (= 98 participants × 4 news viewings per participant). The previous exposures appeared to evenly distribute across the eight news stimuli (*Chi-square*=12.487; *p*=.086).

Manipulation check

This study manipulated the experimental condition based on an intrinsic message feature (i.e., human interest frame vs. non-human interest frame), rather than message effects, so a manipulation check is unnecessary (O'Keefe, 2003). However, it still seems valuable to explore whether respondents perceived the differences in news frames of the selected news stimuli. Question items for manipulation check on a five-point scale (1 = not at all, 5 = very much) were integrated with other items for news evaluation in order to conceal the manipulation of this study. Participants successfully distinguished a human interest frame from a non-human interest frame. Specifically, they perceived news stories in the human interest frame condition as (a) more focusing on human aspects (*Mean* (*SD*)=4.194 (.586) vs. 2.689 (1.034); *F*(1, 97)=160.407, *p*<.001; *partial* η^2 =.623), (b) highlighting a patient's side of the event (*Mean* (*SD*)=4.306 (.695) vs. 1.898 (.911); *F*(1, 97)=421.873, *p*<.001; *partial* η^2 =.813), (c) involving human emotions (*Mean* (*SD*); 4.010 (.669) vs. 1.980 (.928); *F*(1, 97)=285.259, *p*<.001; *partial* η^2 =.746), and (d) emotion-appealing (*Mean* (*SD*)=3.842 (.695) vs. 2.071 (.950); *F*(1, 97)=217.349, *p*<.001; *partial* η^2 =.691). On the other hand, human interest framed news stories were perceived as less focused on scientific information (*Mean* (*SD*)=3.526 (.716) vs. 4.311 (.611); *F*(1, 97)=73.818, *p*<.001; *partial* η^2 =.432) and less focused an expert's side of the event

(*Mean* (*SD*)=3.505 (.741) vs. 3.735 (.883); *F*(1, 97)=4.814, *p*<.05; *partial* η^2 =.047). Although this study tried to ensure an equivalent level of scientific expertise or information complexity across the two frame conditions, respondents seemed to evaluate news stories in a relative manner (for example, putting "focus on human aspects" in one end and "focus on scientific information" in the other end of a continuum). However, the effect size was lower in the last two responses than other responses, especially with the degree of presenting an expert's side of the event in the news.

As for the responses to manipulation, there were no significant main effects or interactions for the eight subsets used in the experiment, which means that individuals perceived the difference in news frame no matter what they were assigned among the eight versions of news stimuli. This also implies that the manipulation of news stories was relatively stable within each condition across the eight subsets.

Procedure

A total of 99 individuals participated in this study in June 2010. Participants were recruited from classes at the University of Missouri. A recruitment ad was distributed through several email listservs of undergraduate and master's students in journalism and other majors at the university. Participants were compensated with either extra course credit or a $10 cash incentive (or a gift card for online/offline retailers of equivalent value). Once a participant signed up for the study via email, s/he was invited to visit a designated website and completed the questionnaire online. Participants were randomly assigned to one of the eight versions of the study via one of eight website addresses.

Participants started answering questions after they agreed with an informed consent form on the first page. Before watching the news stories, they were asked to answer a preliminary questionnaire, including measures of health consciousness, general health status, and pre-existing attitudes toward medical science in general. Because news frame was a within factor, participants then watched a combination of two stories in a human interest frame and two stories in a non-human interest frame, presented in a different order. After each news story, participants were asked to indicate their responses to the message, including level of involvement in the news, emotional experiences, level of identification (only for human interest framed stories), and perceptions of news story, medical advance/research described, and individual healthy behaviors. The order of multiple-item scales was randomized in all questionnaires. The same procedure was continued until four stories were finished. At the end, personal information was asked, including: gender, age, race, academic standing, major, and household income.

Measurements

This section addresses how each concept was measured in the study. For the detailed questionnaire, see Appendix B. When the questionnaire was presented in the experiment, the order of items was randomized for every multi-item scale.

Involvement in the news story. The degree to which audiences were involved/engaged in and attentive to the news story was measured using four items, some of which were adapted from Nabi and Prestin (2007): (e.g., "How closely did you watch the news story?" "How much attention did you pay to the news story?" "How much did you feel that you were immersed in the news story?"). Responses were indicated on a

seven-point scale from 1 (not at all) to 7 (very much). In order to ensure conceptual

difference between involvement in the news and involvement in the story topic (e.g.,

Slater & Rouner, 2002), two additional items measuring the latter were included: "How

much did you find the news story relevant to you, your family, and significant others?"

and "How much did you find the news story was an important topic to you, your family,

and significant others?" Principal component analysis using Promax with Kaiser

normalization extracted two distinct components – involvement in the news vs.

involvement in the topic – as expected. It also turned out that the two identified

components were not highly correlated (component correlation=.251), and the two items

measuring involvement in the topic were not used for further analyses. Cronbach's alpha

score of the four items measuring involvement in the news story was .884.

News evaluation. Participants were asked to indicate how they had perceived the

news story on a five-point semantic differential scale (1 to 5). A message evaluation scale

was adapted from Slater and Rouner (1996) and Beltramini (1988): questionable-

believable, untrustworthy-trustworthy, not convincing-convincing, not credible-credible,

unlikely-likely. Given the scholarly concerns associated with news stories about medical

advances, such as inaccuracy, misleading information, exaggeration of research results or

implications, and sensationalism, a few other adjective sets were also included:

inaccurate-accurate, doubtful-verified, biased-unbiased, distorted-undistorted,

exaggerated-not exaggerated, and sensationalistic-not sensationalistic. Data reduction

was conducted using principal component analysis using oblique rotation with promax

option to verify underlying components of news evaluation. This analysis generated two

distinct components, and all of the items were loaded on one of the two identified

components with loading scores greater than .594 (mostly above .800). Component 1 explained 56.1% of variance, and component 2 accounted for 12.5 % of variance, which together explained 68.6% of total variances. The first component included seven sets involving "believable, trustworthy, convincing, credible, likely, accurate, and verified" whereas the other component was associated with the four adjective sets, "biased, distorted, exaggerated, and sensationalistic." The first component, named "news believability," focused on the quality of news content. Higher scores indicated greater believability of the news story (Cronbach's alpha=.937). On the other hand, the second component was named "news distortion" because the items loaded on this component were likely to involve the representation of news content. The items of news distortion dimension were reverse-coded in order for high scores to denote greater distortion, bias, exaggeration, and sensationalism (Cronbach's alpha=.766)

Perceived understandability of health information. The level of information understandability (or lack of information complexity) of the news stories was asked using such questions as, "How many viewers do you think would understand the scientific information in the news story?" (5=nearly all; 4=about 75%; 3=about 50%; 2=about 25%; 1=less than 25%), "How likely do you think it is that viewers feel comfortable with following the scientific information in the news story?" (1=very low; 2=somewhat low; 3=moderate; 4=somewhat high; 5=very high), and "How much of the scientific information in the news story do you think you understood?" (5=nearly all; 4=about 75%; 3=about 50%; 2=about 25%; 1=less than 25%). Two semantic differential scales (i.e., difficult to follow vs. easy to follow, difficult to understand vs. easy to understand) on a five-point scale (1 to 5) were combined to measure perceived understandability of health

46

information. Principle component analysis with no rotation based on Kaiser's rule (i.e., eigenvalue 1 or higher) supported a sole component underlying the five measures of understandability with a minimum loading score of .737, and the component explained 65.5% of observed variances. The scores were averaged, with higher scores indicating greater understandability. Cronbach's alpha of .867 indicated a highly reliable scale.

Perceptions of medical advance/research described in the news story. Seven questions were developed to measure individuals' appreciation of and support for the medical advance/research and medical scientists/doctors described in the news stories. On a seven-point scale (1 = not at all to 7 = very much), respondents were asked the extent to which they (a) support government funding for the type of medical advance/research described in the news, (b) support private funding for the type of medical advance/research described in the news, (c) are confident in the type of medical advance/research described in the news to develop effective cures or detection/diagnosis for diseases, (d) are confident in the type of medical advance/research described in the news to improve public health, (e) believe that the type of medical advance/research described in the news contributes to the quality of individual life, (f) believe that the type of medical advance/research described in the news is important in society, and (g) believe that medical scientists/doctors described in the news care about people. Scores were aggregated by calculating the average score (Cronbach's alpha= .924). The higher scores respondents reported, the more positive perceptions they had toward medical advance/research described in the news.

Perceptions of individual healthy behaviors. In order to measure how people think about health-promoting behaviors at an individual level, four items were employed using

47

a seven-point Likert scale from 1 (strongly disagree) to 7 (strongly agree). The individual healthy behavior was considered regarding two aspects: a healthy lifestyle and disease-preventive action. The items included behavioral intention (e.g., "I am willing to maintain a healthy lifestyle," "I am willing to get regular checkups or recommended disease screening") and perceived significance of individual healthy behaviors (e.g., "It is important to engage in a healthy lifestyle," "It is important to get regular checkups or recommended disease screening"). Cronbach's alpha score reached .883.

Emotional reactions. To measure four discrete emotions (i.e., hope, fear, anger, relief), three adjectives for each emotion were presented for participants to indicate how they felt while watching the news story. All measures were presented on a seven-point scale from 1 (not at all) to 7 (very much). The presented adjectives included: *hopeful, optimistic,* and *encouraged* for hope; *fearful, nervous,* and *worried* for fear; *upset, angry,* and *annoyed* for anger; and *relieved, reassured,* and *comfortable* for relief. However, the result of factor analysis (principle component analysis using oblique rotation method Promax with Kaiser normalization) did not clearly extract four distinct emotions from the twelve items. Rather, it separated positive emotions (i.e., hope, relief) from negative emotions (i.e., anger, fear). All items were successfully loaded in one of the two identified components with the loading score between .510 and .864. The two identified components were rarely correlated (r=-.029). Thus, in analyzing data, hope and relief were congregated in one component of positive emotion while anger and fear were in the other component of negative emotion. Cronbach's alpha scores were .903 for positive emotion and .851 for negative emotion.

Identification with an exemplar. In response to human interest framed news stories, identification with a human exemplar in the news story was measured in four dimensions: similarity, sympathy, empathy, and parasocial interaction. Respondents were asked how much they agreed or disagreed with the statements about their experience while watching the news story on a seven-point Likert scale (1 = strongly disagree, 7 = strongly agree). Three items measuring perceived similarity were adapted from Bouman, Maas, and Kok (1998) (e.g., "I thought that what the patient in the news experienced could happen to me too," "I thought that the patient in the news was similar to me"). The scales for measuring sympathy and empathy were modified from Escalas and Stern (2003). As conceptualized, the five-item empathy scale asked about an audience's shared feeling with an exemplar (e.g., "I felt as if the feelings of the patient in the news were my own," "I experienced many of the same feelings that the patient in the news expressed"), while the five-item sympathy scale was concerned about an audience's recognition of an exemplar's feelings and surrounding situation (e.g., "I understand what the patient in the news was feeling," "I was able to recognize the problems that the patient in the news had"). The last dimension of identification, or parasocial interaction, was measured with four selected items adapted from Sood (2002) and Bouman et al. (1998), such as "I felt that the patient in the news was like people I know" and "I felt comfortable, as if the patient in the news was my friend or a family member." Items in each dimension (i.e., perceived similarity, empathy, sympathy, parasocial interaction) were averaged to calculate the indices of identification, with higher scores indicating higher levels of identification with an exemplar in the news story. Cronbach's alpha scores were highly

acceptable across four indices: perceived similarity (.914), empathy (.916), sympathy (.827), and parasocial interaction (.799).

Health consciousness. Level of health-consciousness was measured by the 11-item health consciousness scale (Hong, 2009), which was adapted from previous studies (Dutta, 2007; Gould, 1988; Kraft & Goodell, 1993; Michaelidou & Hassan, 2008). This scale consists of four items measuring personal responsibility for one's health (e.g., "My health depends on how well I take care of myself," "I take responsibility for the state of my health"), five items measuring self-health awareness (e.g., "I notice how I feel physically as I go through the day," "I reflect on my health a lot"), and two items measuring health motivation (e.g., "Living life without disease and illness is very important to me"). Respondents were asked to indicate how much they agree with each statement on a seven-point Likert scale, from 1 (strongly disagree) to 7 (strongly agree). Scores were averaged to calculate an index of the health consciousness variable, with higher scores indicating greater health consciousness. The Cronbach's alpha score of .809 supported a highly stable internal consistency of the scale.

The health consciousness scores among research participants ranged from 2.55 to 7.00, with the average score of 5.486 and the standard deviation of .756. Since the distribution did not much deviate from a normal curve,[5] participants were divided into three groups based on z-score of health consciousness: low ($Z < -.5$, recoded as 1), medium ($-.5 \leq Z \leq .5$, recoded as 2), and high ($Z > .5$, recoded as 3) health-conscious groups. About a third of participants were categorized into each group: 31.6% (N=31),

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[5]The skewness was -.620 (*SE*=.244) and the kurtosis was 1.330 (*SE*=.483). The z-scores of skewness and kurtosis were 2.541 and 2.754, respectively.

35.7% (N=35), and 32.7% (N=32) for the low, medium, and high health conscious group, respectively.

A few other variables were included for control purposes: *Pre-existing attitude toward medical science* and *current health status*. Because pre-existing attitude toward the issue is a major predictor of responses to the message (Slater & Rouner, 1996), *pre-existing attitude toward medical science* was measured before participants watched any of the health news stories. The eight-item scale was used, consistent with the measures for perception of medical advance/research described in the news. However, participants were asked to report their opinion about medical science/scientists in general, rather than in terms of a particular topic or type of research. For *current health status*, two questions were taken from SF-36, which is a popular questionnaire for measuring generic health status (McHorney, Ware, Lu, & Sherbourne, 1994; Ware & Sherbourne, 1992): (a) In general, would you say your health is… (1=poor; 2=fair; 3=good; 4=very good; 5=excellent); (b) Compared to one year ago, how would you rate your health in general now? (5=much better now; 4=somewhat better now; 3=about the same; 2=somewhat worse now; 1=much worse now). In order to avoid the influence of news stimuli, all control variables were measured before the viewing of news stories.

Demographic variables. Participants' age, gender, race, academic standing, major, and household income were also asked at the conclusion of the questionnaire.

Analysis technique

SPSS version 17.0 was used for the analysis. To test hypotheses and research questions concerning main effects and interaction effects of independent variables (i.e.,

news frame, health consciousness), this study first employed repeated measures ANOVAs. Additionally, the bootstrapping analysis with macro/syntax was performed in order to identify dynamic relationships among variables, such as mediation (through audience involvement and emotional response) and moderated mediation.

The bootstrapping analysis is often used to test indirect effects (or mediation) of variables. Preacher and Hayes proposed the bootstrapping method to test indirect effects in simple mediation and multiple mediator model (Hayes & Preacher, 2006; Preacher & Hayes, 2008) and to test conditional indirect effects (i.e., moderated mediation model) (Preacher, Rucker, & Hayes, 2007). This study followed Preacher and colleagues' guidance in testing indirect effects based on several advantages of this analytic technique.

Because the bootstrapping method relies on a re-sampling approach, it does not require normality assumption of sampling distribution, which provides great benefits in analyzing a small-sized data set, like the one in this study (Preacher & Hayes, 2008; Preacher et al., 2007). Basically, the bootstrapping method generates an empirical sampling distribution of an indirect effect through repeated sampling from a given dataset, and calculates percentile-based asymmetric confidence intervals (Preacher & Hayes, 2008). Thus, the bootstrapping can reflect the actual skew of the distribution in calculating confidence intervals, which cannot be achieved by other statistical methods (e.g., the product-of-coefficients approach) (Preacher & Hayes, 2008). In addition, Preacher and Hayes (2008) noted that the bootstrapping method is robust because it increases power and reduces type I error.

CHAPTER 4

RESULTS

Descriptive statistics

A total of 99 respondents participated in the experiment. Female respondents (64.6%) outnumbered male respondents (35.4%). A majority of respondents were Caucasian/White (68.7%), followed by Asian/Pacific Islander (13.1%) and African American/Black (7.1%). About 60% of respondents were undergraduate students; the rest were graduate students – either master's (32.3%) or doctoral level (4.1%)[6]. The age of respondents ranged from 18 to 41, with an average of 22.9 (SD=3.883), and 99.0% were young adults between 18 and 34.

Data screening and assumption check

Responses and log-times were carefully reviewed for screening. First, a respondent was deleted because of his/her effortless answers; s/he finished the study within an extremely short time and marked every question in a row. Overall, distribution of other responses in each variable did not much deviate from a normal curve. Although a couple of outliers were detected in emotion measures (e.g., fear, anger) based on ±3.29 S.D. criteria, they were kept because their responses were neither extreme (within 3.84 S.D. and 3.50 S.D. ranges, respectively) nor seriously affected the normal distribution. Additionally, because this study mainly used the bootstrapping method, which does not

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[6] Most of the graduate students were either from the journalism or MPH (Master of Public Health) program. Compared to recruiting only undergraduate college students in a relatively homogeneous group, the inclusion of graduate students was advantageous to obtain greater variances in many responses in the experiment, including their level of health consciousness, news evaluations, and perceptions of medical science/research.

require a normal distribution, minor outliers were not expected to affect the results of analyses.

In order to make sure respondents viewed the news stimuli with a constant level of motivation throughout the experiment, a quiz-type of question about the news content was included for each news stimulus. These test questions were supposed to prevent respondents from skipping the news stories and keep a minimum level of effort during the experiment. The high ratio of correct answer implies that respondents participated in the study sincerely (86.9% of respondents had correct answers for all of the four questions, and 10.1% and 3.0% missed one or two questions, respectively). Occurrence of wrong answers was statistically consistent across the eight news stimuli (*Chi-square*=8.411; *p*=.298). No further data were excluded given the adequate level of effort made by every participant. Thus, responses from a total of 98 participants were analyzed for testing hypotheses and research questions.

Before running ANOVAs, two assumptions were checked: Normality and homogeneity of variance-covariance. Normality assumption was checked by distribution scores of skewness and kurtosis along with histograms with a normal curve. Homogeneity of variance-covariance matrices were tested by using two statistical techniques – Box's M test and Levene's test. In both tests, homogeneity is assumed when the null hypothesis asserting equal variance/covariance is retained (i.e., *p*>.05). In most tests using repeated measures ANOVAs, the two assumptions were secured. However, in case of violation (e.g., perception of individual healthy behaviors), alpha score to reject or retain a null hypothesis was adjusted to .025, instead of .05, in order to more rigorously test the hypotheses.

Testing hypotheses and research questions

Main effects and interaction effects of IVs

The first part of this study investigates the impact of news frames and one's health consciousness in responding to television news stories about medical advances. A 2 (frame) × 3 (health consciousness) mixed repeated measures ANOVA was conducted on the proposed dependent variables to test the main and interaction effects of news frame and health consciousness (Table 1). Because interaction between news frames and health consciousness was rarely found, this section mainly illustrates the main effects of each independent variable.

First, a series of hypotheses predicted the influence of a human interest frame vs. a non-human interest frame, and the analysis showed significant differences in many dependent variables (Table 2). H1 proposed increased level of audience involvement in the news stories in a human interest frame, compared to a non-human interest frame, and the difference was statistically significant at $p<.001$ ($F(1,95)=16.332$; *partial $\eta^2 =.147$*). Human interest framed stories led to greater audience involvement in the news stories (*Mean*=5.469, *SD*=.991) than non-human interest framed stories (*Mean*=5.055, *SD*=1.037).

H2 suggested the influence of news frame on audiences' news evaluation. In the first news evaluation dimension identified (i.e., news believability), news stories about medical advances in a human interest frame were perceived more favorably than those in a non-human interest frame ($F(1, 95)=42.726$, $p <.001$; *partial $\eta^2=. 310$*). Human interest framed news stories (*Mean*=4.251, *SD*=.621) were perceived as being more believable,

credible, trustworthy, convincing, accurate, and verified than their counterparts (*Mean*=3.842, *SD*=.726). On the other hand, there was no significant difference between the two frames in the second dimension – news distortion ($F(1, 95)$=2.047, p =.156; *partial η^2*=. 021). Respondents' perceptions of a human interest frame (*Mean*=2.325, *SD*=.730) and a non-human interest frame (*Mean*=2.415, *SD*=.730) were both toward the "not distorted" end from the mid-point to almost the same extent. In addition, respondents perceived human interest framed news stores as more understandable than non-human interest framed news stores ($F(1, 95)$=75.629, p <.001; *partial η^2*=. 443). The scientific information in the human interest framed stories was perceived as easier and less complex to follow/understand to general viewers as well as to themselves (*Mean*=4.183, *SD*=.588) than those in the non-human interest framed stories (*Mean*=3.639, *SD*=.717).

H3 posited the positive influence of news frames on perceptions of medical advances/research portrayed in the news, and it was supported. Medical advances depicted in a human interest frame (*Mean*=5.446, *SD*=1.028) were more likely to be perceived favorably than those in a non-human interest frame (*Mean*=4.832, *SD*=1.217). The impact of a human interest frame was significant even after controlling for pre-existing attitude toward medical science and scientists at p<.05[7] ($F(1, 94)$= 3.975; *partial η^2*=. 041). For the medical advance/research described in the human interest framed news, people were more likely to appreciate its contribution to society and individual life, to be confident in its role in public health, and to support government and private research funding.

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[7] The main effect of pre-existing attitude toward medical science/scientists as a covariate was significant ($F(1, 94)$=77.830, p <.001; *partial η^2*=.453).

RQ1 questioned the potential influence of news reports about medical advances on the audience's perception of individual healthy behaviors, such as a healthy lifestyle and disease preventive actions. There was no difference found in the influence of news frame on their intention to engage in healthy behaviors and the value of healthy behaviors ($F(1, 95)=.251$, $p =.617$; *partial $\eta^2=.003$*). Responses on a seven-point scale were relatively high regardless of news frames: *Mean=6.085, SD=.964* for a non-human interest frame; *Mean=6.112, SD=.910* for a human interest frame.

For the emotional responses induced by the news stories (H5), news stories about medical advances presented in a human interest frame turned out to generate stronger positive emotions than those presented in a non-human interest frame ($F(1, 95)=42.732$, $p <.001$; *partial $\eta^2=.310$*). Respondents reported a greater level of hope and relief in response to human interest framed news stories about medical advances (*Mean=4.338, SD=1.239*) than their counterparts (*Mean=3.605, SD=1.338*). On the other hand, negative emotions, such as fear and anger, were not salient in either a human interest news frame (*Mean=1.759, SD=.858*) or a non-human interest frame (*Mean=1.773, SD=.804*), and there was no difference in the intensity of negative emotional responses to the two frames ($F(1, 95)=.049$, $p =.826$; *partial $\eta^2=.001$*).

This study also proposed research questions about the influence of one's level of health consciousness on news message processing (RQ3a). Overall, the degree to which individuals are conscious about their health did not cause as much influence as news frame did (Table 1). However, health consciousness was a significant predictor of the level of audience involvement in news stories ($F(2, 95)=5.015$, $p=.009$; *partial $\eta^2=.095$*). Overall, the more conscious people were about their health, the more likely they were to

be involved in and attentive to the news stories (Table 3). Particularly, a post-hoc analysis using the Turkey method showed that the difference in audience involvement was statistically significant between the low health conscious group (*Mean*=4.917, *SD*=.663) and the high health conscious group (*Mean*=5.625, *SD*=.845) at a .01 level.

Perception of individual healthy behaviors appeared to be associated with level of health consciousness although it was the only dependent variable not affected by news frame. Regardless of news frames, people with high health consciousness were more likely than those with low health consciousness to perceive individual healthy behaviors as more important and to be willing to engage in a healthy lifestyle and take active disease preventive actions (e.g., disease screening, regular check-ups) (F(2, 95)=6.709, p =.002; *partial η^2*=.124). In this regard, the low health conscious group (*Mean*=5.765, *SD*=.944) was significantly different from the medium group (*Mean*=6.000, *SD*=.979) at p<.05 and from the high group (*Mean*=6.531, *SD*=.569) at p<.01.

Interaction between news frames and health consciousness (RQ3b) was found only in terms of audiences' negative emotion experienced during the viewing (Table 1) (F(2, 95)=3.499, p =.034; *partial η^2*=.069). Overall, the greatest negative emotions were induced among medium-level health conscious individuals in both a human interest (*Mean*=1.941, *SD*=.947) and a non-human interest frame (*Mean*=1.917, *SD*=.864). As Figure 1 shows, however, the pattern of negative emotional responses flipped between the high health-conscious group and the low health conscious group. The low health-conscious group felt greater fear and/or anger in response to the human interest frame (*Mean*=1.766, *SD*=.861), as opposed to the non-human interest frame (*Mean*=1.597; *SD*=.794). In contrast, the high health-conscious group reported greater fear and/or anger

in response to the non-human interest frame (*Mean*=1.787, *SD*=.729) than to the human interest frame (*Mean*=1.552, *SD*=.722).

Indirect effects: Simple mediation model

In order to test indirect effects of news frame and health consciousness, a bootstrapping analysis was performed using SPSS macro and syntax for testing indirect effects retrieved from http://quantpsy.org (Hayes & Preacher, 2006; Preacher & Hayes, 2008). Figure 2 represents a simple mediation model, on which the indirect effect macro and syntax are based. In the findings of a bootstrapping analysis of simple mediation (Table 4 to Table 7), path coefficients and *p*-values, indicating direct and total effects of IVs on DVs, were all consistent with the findings of repeated measures ANOVAs performed in the previous sections (Table 1).

First, the mediating role of audience involvement was tested in the influence of news frame on the proposed dependent variables (H4). As Table 4 shows, audience involvement in the news successfully mediated the influence of news frame. Bias corrected bootstrap 95% confidence intervals[8] support that audience involvement mediates the influence of news frames on audiences' evaluation of news believability (.0416, .1780) and news distortion (-.1108, -0238), perceived understandability (.0519, .1926), perceptions of portrayed medical advances/research (.0426, .1912), and perceptions of individual healthy behaviors (.0579, .2541). In other words, a human-focused news frame increased audience involvement in the news (*path coefficient*=.4207, *SE*=.1292, *p*<.001), which, in turn, led audiences to (a) evaluate the news stories as more believable/credible, less distorted/biased, and more understandable, (b) perceive greater

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[8] In the bootstrapping method, mediation is supported with 95% confidence when the interval does not contain zero.

social contribution and need for research funding in favor of medical science/scientists, and (c) become more favorable toward individual healthy behaviors, such as a healthy lifestyle and disease preventive actions (see path coefficients from mediator to DVs in Table 4). In particular, although the direct effect of news frame on perceptions of individual healthy behaviors was not significant, the mediation of audience involvement turned out to be statistically meaningful on this dependent variable.

The mediation of emotional responses was explored next (RQ2). Because negative emotions – anger and fear – were not substantially induced among participants who watched news stories about medical advances (with an average of less than two on a seven-point scale), only positive emotion was tested for its potential mediating role. The result showed that level of positive emotion – hope and relief – experienced by audiences played a mediating role in the influence of news frame on diverse aspects involving news evaluation (BC 95% CIs[9]: (.0782, .2105) for news believability; (-.1724, -.0536) for news distortion; (.0788, .2039) for understandability) and perceptions of medical advances/research (.0933, .2680) and perceptions of individual healthy behaviors (.0667, .2286) (Table 5). Compared to non-human interest framed news stories, human interest framed stories led to a greater level of hope and relief (*path coefficient*=.7399, *SE*=.1525, *p*<.001), and this directed favorable evaluation in terms of news believability (*path coefficient*=.1863, *SE*=.0253, *p*<.001), news distortion (*path coefficient*=-.1452, *SE*=.0295, *p*<.001), and understandability (*path coefficient*=.1809, *SE*=.0274, *p*<.001). Increased hope and relief resulted from a human interest frame, and also directed positive

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[9] Bias corrected bootstrap 95% confidence intervals.

perceptions of medical advances/research (*path coefficient*=.2292, *SE*=.0365, *p*<.001) and individual healthy behaviors (*path coefficient*=.1782, *SE*=.0349, *p*<.001).

The current study additionally probed the potential mediation of audience involvement and positive emotion in the impact of health consciousness, although it turned out that health consciousness did not play much of a role in direct effects on news evaluation and perceptions pertaining to medical science. For the influence of health consciousness, the mediating role of audience involvement and positive emotion was consistent with the findings in regard to news frame.

The more health-conscious individuals were, the more closely they were involved in news stories (*path coefficient*=.3288, *SE*=.0801, *p*<.001) and the greater hope and relief they felt (*path coefficient*=.2365, *SE*=.0976, *p*<.05) while watching the news stories. Increased levels of audience involvement and positive emotion consequently influenced positive news evaluations and positive perceptions of medical advances/research and individual health behaviors (see path coefficients and *p*-values in Table 6 and 7). Thus, both audience involvement and positive emotional reaction appeared to mediate the impact of individuals' health consciousness, too (see BC bootstrap 95% confidence intervals in Table 6 and 7).

Indirect effects: Multiple mediation model

In the previous tests, audience involvement in news stories turned out to mediate the relationships between news frame and its cognitive consequences, such as news evaluation and perceptions of medical advances/research, with the human interest frame enhancing audience involvement in news stories. The present study hypothesized that the influence of audience involvement is mediated by the degree to which audiences identify

with an exemplar in the human interest framed news stories (H6). In other words, this study proposed that audiences' identification with the person exemplified in news stories is a potential mechanism in which the human interest frame works in news consumption. Because this study conceptualized four dimensions of identification – perceived similarity, sympathy, empathy, and parasocial interaction – a bootstrapping analysis based on multiple mediator model (Figure 3) was conducted using the same SPSS macro and syntax retrieved from http://quantpsy.org (Hayes & Preacher, 2006; Preacher & Hayes, 2008).

H6a posited that the level of audience identification with an exemplar in a news story will mediate the influence of audience involvement on the news evaluation, and this is partially supported (Table 8). The results of a bootstrapping analysis showed that three dimensions of audience identification were relevant to their news evaluation. Sympathy (.0111, .0943), empathy (-.0971, -0102), and parasocial interaction (.0094, .1002) mediated the influence of audience involvement on perceived believability of news, while empathy (.0094, .1379) and parasocial interaction (-.1520, -.0176) mediated its influence on perceived distortion. The greater sympathy and parasocial interaction with the person in the news, the more likely audiences perceived the news to be believable, trustworthy, and accurate. A greater level of parasocial interaction also led audiences to perceive the news to be far from bias, distortion, exaggeration, and sensationalism. However, the level of audiences' empathy with the human exemplar reversed the news evaluation. The more empathetic audiences were, the more likely they evaluated the news as questionable, untrustworthy, inaccurate, doubtful, biased, distorted, exaggerated, and sensationalistic. For the perceived understandability of news (H6b), all of the 95% confidence intervals of

the four proposed mediators appeared to contain zero (Table 8). In other words, none of the four identification dimensions were related to how much difficulty audiences had in understanding the news and how much difficulty they expected other viewers to have.

Additionally, of the four identification dimensions, level of sympathy with an exemplar mediated the influence of audience involvement both on how people perceived the medical advances/research described in the news story (.0459, .1942) and individual healthy behaviors (.0320, .1480). The level of audience involvement in the news became higher as a person sympathized with the exemplar (*path coefficient*=.3970, *SE*=.0643, *p*<.001), and influenced the positive perception of medical advances/research in the news (*path coefficient*=.2910, *SE*=.0721, *p*<.001) and individual healthy behavior (*path coefficient*=.1998, *SE*=.0632, *p*<.01). The other three dimensions – perceived similarity, empathy, and parasocial interaction – did not affect their perceptions in this aspect. Level of sympathy also mediated the influence of audience involvement on the intensity of positive emotional reactions among respondents (.0125, .1862). When people sympathized with an exemplar in a news story, the increased audience involvement in the news story led audiences to experience greater positive emotion, such as hope and relief, while watching the news.

Conditional indirect effects: Mediated moderation model

In addition to indirect effects of news frames mediated by audience involvement and emotional response, this study put forth a question about moderated mediation, which is a conditional indirect effect contingent on the level of a moderator (Preacher et al., 2007). Moderated mediation occurs when the strength of mediation (or an indirect effect) varies depending on the level of a moderator (Preacher et al., 2007). In the current study,

individuals' health consciousness with three levels (1=low; 2=medium; and 3=high)

served as a moderator. In order to test conditional indirect effect (or mediated

moderation), Preacher et al. (2007) recommended scholars use both the product of

coefficients method (i.e., normal-theory tests of the hypothesis using the Johnson-

Neyman technique) and the bootstrapping method (i.e., a re-sampling approach).

Following their suggestion, this study tested whether the mediating role of audience

involvement and positive emotion is contingent on the level of moderator, or health

consciousness (RQ3c and RQ3d). SPSS macro and syntax for testing moderated

mediation were downloaded from http://quantpsy.org.

Tests for moderated mediation, having news frame as an IV, health consciousness

as a moderator, and audience involvement and emotional reaction as mediators (one at a

time), did not generate many significant results. Out of several dependent variables

previously tested, only perceptions of medical advances/research resulted in a significant

conditional indirect effect while controlling for pre-existing attitude toward medical

science.

First, indirect effect of news frame on perception of medical advances/research

described in the news through level of audience involvement was significantly moderated

by individuals' health consciousness (*path coefficient of interaction*=.2777, *SE*=.1247,

p<.05). Specifically, it turned out that the moderator (i.e., health consciousness) affected

the path from IV (i.e., news frame) to mediator (i.e., audience involvement), as specified

in Figure 4 (Preacher et al.'s (2007) second model). The results of conditional indirect

effects based on bootstrap estimates were consistent with those based on the Johnson-

Neyman (N-J) technique. As Table 9 shows, the magnitude of indirect effect was larger

for people with lower health consciousness. The indirect effect was the greatest among low health-conscious people (*indirect effect*=.1594, *SE*=.0543, *p*<.01), followed by medium level health-conscious people (*indirect effect*=.1089, *SE*=.0365, *p*<.01). However, the mediation was not significant among those with high health consciousness (*indirect effect*=.0585, *SE*=.0526, *p*>.05). The moderator value calculated by Johnson-Neyman Significance Region(s) was 2.5558, indicating that the mediation through audience involvement in the effect of news frame on perception of medical advance becomes significant with a health consciousness value under 2.5558.

Likewise, indirect effect of news frame on perception of medical advance/research described in the news through level of positive emotion experienced by individuals was contingent on the level of their health consciousness (*path coefficient of interaction*=.1123, *SE*=.0437, *p*<.05). In this case, however, the moderator (i.e., health consciousness) appeared to affect the path from mediator (i.e., emotional response) to DV (i.e., perception of medical science), as specified in Figure 5 (Preacher et al.'s (2007) third model). In terms of strength of indirect effect, the pattern was reverse again (Table 10). Contrary to the indirect effect through audience involvement, the indirect effect through positive emotion was larger for people with higher health consciousness. The indirect effect was greater among people with high health consciousness (*Indirect effect*=.2436, *SE*=.0668, *p*<.001) than among people with medium-range health consciousness (*Indirect effect*=.1609, *SE*=.0404, *p*<.001). However, the indirect effect was not significant among low health-conscious people (*Indirect effect*=.0782, *SE*=.0412, *p*>.05). The estimated indirect effect at three values of the moderator was consistent between the bootstrap and the Johnson-Neyman method. According to the Johnson-

Neyman Significance Region(s), indirect effect is significant with the moderator value above 1.099.

A post-hoc analysis: Gender differences

Although not hypothesized, this study additionally probed gender difference in the influence of news frame, and found frame-gender interactions regarding some dependent variables, such as perceived news believability ($F(1,96)$=6.316, $p<.05$; *partial η^2*=.062) and perception of the medical advances/research ($F(1,95)$=4.401, $p<.05$; *partial η^2*=.044). For the perceived news believability, females (*Mean*=4.337, *SD*=.642) were more likely than males (*Mean*=4.090, *SD*=.552) to favorably evaluate human interest framed news stories, while there was no gender difference in response to non-human interest frames (Male: *Mean*=3.889, *SD*=.578 vs. Female: *Mean*=3.817, *SD*=.797). Similarly, females (*Mean*=5.530, *SD*=1.027) were more likely than males (*Mean*=5.288, *SD*=.1.025) to report greater favor toward the portrayed medical progress in a human interest frame. However, for the stories in a non-human interest frame, males (*Mean*=4.935, *SD*=1.161) were slightly more positive about the medical progress than females (*Mean*=4.777, *SD*=1.252), but the difference was not statistically significant.

In addition, for female respondents, perceived similarity, rather than parasocial interaction, better worked for the mediating role in the influence of human interest framing on news evaluation. Specifically, perceived similarity (.0040, .0971), along with sympathy (.0017, .1173) and empathy (-.1481, -.0076), was a significant mediator on the news frame-news believability link.[10] Together with empathy (.0117, .1948), perceived

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[10] Scores in parentheses denote corrected bootstrap 95% confidence intervals.

similarity (-.1506, -.0071) also mediated the influence of news frame on news distortion.

CHAPTER 5

DISCUSSION

Like in other topic areas, news production in the area of health and medicine involves health journalists' selection of sources, resources, priorities, and story angles (Wallington, Blake, Taylor-Clark, & Viswanath, 2010). This study suggested that personalizing a news story by providing a human exemplar and his/her personal anecdote (i.e., human interest framing) may serve to set a unique story angle in reporting medical advances. This study unfolded the impact of such a news frame (i.e., a human interest frame) on audiences' cognitive and emotional responses.

In reporting medical advances, the events can be constructed in terms of individual benefits of the advances by selecting ordinary patients and discussing their experiences with the medical advances. This study showed that this strategy may activate audiences' thoughts about social impact of the advances and direct more favorable perceptions of medical research/science. Entman (1993) argued that news frames serve to provide causal interpretation and moral evaluation of the event in the news. On the coverage of medical advances, human interest frames likely encourage favorable interpretations of the advances by personalizing the story, and, subsequently, accelerating the moral evaluation that medical advances save ordinary people like those exemplified in the news. Thus, employing an exemplar in reporting news goes far beyond the decision of whether or not to include a quote from an ordinary (or real) person in the news report. An exemplar in a human interest frame could be a significant news framing tool that magnifies positive public perception of the described medical advances. In this regard,

68

integrating a personal exemplification into a news story is believed to be a remarkable framing strategy like other techniques journalists employ, such as selecting certain words or phrases and stereotypical images.

In response to a human interest frame, people were more likely to be involved in the news story, expressed greater level of hope and relief, and reported more favorable opinions about the medical achievement they watched. News stories in a human interest frame, as opposed to a non-human interest frame, were perceived more positively by audiences. Overall, news stories with a human exemplar were evaluated as being more credible, believable, and accurate. People also reported that health information presented in a human interest frame was more understandable than information presented in a non-human interest frame.

From a survey and interviews with health journalists, Hinnant and Len-Rios (2009) highlighted health journalists' efforts to motivate audiences to be interested in a story and to assist their learning by constructing news stories in a real people-employing human interest frame. Through human interest framing, journalists pursued helping audiences identify with a person or a situation, and ultimately, hoped to influence audiences cognitively, affectively, and even behaviorally in diverse health issues (Hinnant & Len-Rios, 2009). Findings of this study empirically supported such beliefs and desires of health journalists, at least with regard to television news stories about medical advances. It turned out that human interest framing contributed to increasing audience involvement in the news stories, and making the news stories more digestible and attractive to lay audiences. Because of high-profile scientific information (e.g., jargon, scientific formulas), audiences likely consider news stories about medical

69

advances as complicated, boring, and unappealing. However, human interest framing seemed to give audiences an opportunity to feel comfortable with such information, and could reduce audiences' avoidance of this type of medical information.

From the current analysis, the impact of news frames turned out to be mediated by how much people were engaged or involved in the news story. Increased audience involvement in the news story caused positive news evaluation and favorable perceptions of the depicted medical event. Involvement also strengthened audiences' appreciation for and willingness to take part in active healthy behaviors, such as a healthy lifestyle and disease screening. Scholars argued that audience involvement in a story is a foundation of learning beyond one's cognitive ability and genuine interest in or relevance to the story topic (e.g., Brodie et al., 2003; Slater & Rouner, 2002). The findings of this study evince the significance of audience involvement in processing television health news and the effectiveness of human interest framing on increasing audience involvement in the news story. In fact, the current study showed that the influence of audience involvement was substantial regardless of level of personal relevance to the news topic. Moreover, it appeared that audience involvement was affected by both a message feature and an individual predisposition. Particularly, when looking at the impact of news frames and health consciousness, audience involvement served as a powerful mediator regarding some outcomes on which there were no direct effects of news frame and/or health consciousness. In this regard, audience involvement in a news story is a key to understanding the impact of news consumption and a target for achieving desired outcomes, if any. In addition, a more thorough conceptual explication of audience

involvement, distinguished from potential confounding variables, such as prior knowledge and personal relevance, will galvanize an interesting future study.

The influence of news frames was also mediated by positive emotions people felt during their exposure to the news stories. Compared to a non-human interest frame, a human interest frame led to stronger audience involvement and positive emotions, which subsequently affected individuals' positive evaluations of news stories and positive perceptions of medical developments reported in the news stories. Fascinatingly, the level of health consciousness moderated the mediation relations through audience involvement and positive emotion in the effects of news frames on the perception of described medical advances/research (i.e., moderated mediation). The influence of news frames through audience involvement was meaningful in low- and medium-level health consciousness groups, while the mediation through positive emotion was significant only in medium and high health-conscious groups. Additionally, it is worth mentioning that the moderation of health consciousness works differently in the mediation of audience involvement vs. the mediation of positive emotion. For the mediation through audience involvement, health consciousness affected the path from IV (i.e., news frame) to mediator (i.e., audience involvement). However, for the mediation through positive emotion, moderation of health consciousness affected the path from mediator (i.e., positive emotion) to DV (i.e., perception of described medical advances/research). This difference was found by comparing the three models specified in Preacher et al. (2007), which specify conditional indirect effects (aka. moderated mediation) with a moderator affecting the path from an IV to a mediator (Model 2), the path from a mediator to a DV (Model 3), and both paths from an IV to a mediator and from a mediator to a DV (Model

71

5). The dataset best fit Model 2 and Model 3 for conditional indirect effects through audience involvement and emotional response, respectively. Although the conclusion was based on statistical analysis, the identified routes seem logical. Level of health consciousness is more influential on how much people are involved in health news in different frames; greater consciousness about health would encourage people to be more involved in the news stories (i.e., IV-to-mediator path). On the other hand, positive emotional response is rather an outcome of news exposure, and health consciousness affects whether or not such positive emotion directs people to positive perception of the topic (i.e., mediator-to-DV path). Taken together, the results of the specified models and the size of conditional indirect effects depending on the level of the moderator imply that audience involvement does not play much in the process of health news in different frames with high health conscious individuals, compared to those with low and medium levels of health consciousness. In this conditional mediation effect, increased involvement in the news stories, which has been influenced by human interest framing, is a critical route that articulates the impact of news frames used for medical advances. In addition, for those with medium and high health consciousness, intensified positive emotion found greater appreciation and stronger support for medical advances/research. However, low health conscious individuals seemed to be indifferent about medical advances, so the increased positive emotion does not direct more favorable perceptions of medical progress.

In the simple mediation tests, the mediating role of audience involvement (H4) and positive emotion (RQ2) generated very similar results, so additional tests for the two variables in a multiple-mediator model were performed. The results showed that both

variables were still significant mediators in the influence of news frame and health consciousness although the magnitude of path coefficients became a bit lower.[11] Taking the results of simple mediations and moderated mediations into account together, this study concludes that audience involvement and positive emotion are related yet still distinct concepts and play an independent role in individuals' health news processing.

This study speculated that the impact of human interest framing might stem from viewers' identification with a human exemplar in the news story, and to some extent, the results provide evidence for such a speculation. Overall, the influence of audience involvement in the news story was mediated by the degree to which audiences identify with an exemplar in a news story. First, it was shown that all of the four dimensions of identification were highly associated with audience involvement with the news story. The path coefficients from audience involvement to the four identification variables were all statistically significant.[12] Some of them successfully mediated the influence of audience involvement on other cognitive and affective responses. It is noteworthy that sympathy and parasocial interaction substantially mediated the effects of audience involvement. In particular, the degree to which people recognized the exemplar's feeling and situation surrounding the described event (i.e., sympathy) was found to be a major underlying mechanism that could explain the impact of a human interest frame across several consequences (e.g., perceptions of described medical advance/research and individual healthy behaviors). In other words, while watching human interest framed television news stories about medical advances, audiences become more involved in the stories as

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[11] Not reported in the results section.
[12] Perceived similarity (*path coefficient*=.2266, *SE*=.0920, *p*<.05);.sympathy (*path coefficient* =.3970, *SE*=.0643, *p*<.001); empathy (*path coefficient*=.2196, *SE*=.0920, *p*<.05); and parasocial interaction (*path coefficient*=.3701, *SE*=.0774, *p*<.001).

they sympathized with the exemplar, which in turn led to their cognitive judgments and emotional arousals. Sympathy is believed to be a dominant factor that overwhelms other types of emotional engagement with an exemplar (e.g., perceived similarity, empathy) and explains how human interest framing works in consuming television news stories, at least regarding medical advances.

Presumably, the salience of sympathy and parasocial interaction possibly originated from the characteristics of participants – college students and young adults. People in this age group do not usually perceive themselves to be at risk of or vulnerable to adverse health conditions. In fact, the vast majority of participants in the study indicated that their health was in a very good (48.0%) or excellent condition (23.5%). Given the nature of the sample, it is plausible that they hardly recognize similarities or emphasize with the patients in the news (i.e., exemplars). It is logical that they instead understood the situation or the exemplar's feeling from a distance (i.e., sympathy) and/or perceived the exemplars were like their parents, grandparents, and other family members (i.e., parasocial interaction).

Such findings also support Escalas and Stern's (2003) model that outlines a sequence from the message type, sympathy, and empathy, to attitude toward the message. Escalas and Stern (2003) applied this model of audience responses to drama-type television commercials. Looking at the findings of this study, in spite of different genres of media representation (i.e., TV commercials vs. TV news), the sympathy-empathy chain may be satisfactory to explain how television news viewers respond to exemplars and their personal anecdotes in human interest framed news stories. In this regard, Escalas and Stern's (2003) contentions should be revisited. They noted that a sympathetic

74

response was dominant and prior to empathy in responding to a short message because it was hard to provoke empathetic response within a less than one-minute-long television message (Escalas & Stern, 2003). Similarly, this study also showed that it is hard for television news viewers to experience augmented emotional engagement (especially empathy) with an exemplar while viewing a short news snippet. Nevertheless, it is meaningful to see that many consequences of news frame were actually related to how people identified with an exemplar in the news.

In previous studies on entertainment-education programs, scholars highlighted that audience involvement in the storylines and identification with the characters were significantly related to the program's educational effects (Davin, 2000; Slater & Rouner, 2002; Smith et al., 2007; Sood, 2002). Although this study did not directly test learning efficiency through the news stories among respondents, the findings of this study imply the potential of television health news to improve the public's health literacy by enhancing audience identification. Particularly, if a human interest frame contributes to audience involvement in the news story as shown in this study, the increased involvement may help health knowledge acquisition among audiences. Moreover, because television news is largely accessible to a wide spectrum of the population, including the underserved population, it may contribute to reducing the knowledge gap among different classes of the population. Human interest framing seems promising in this respect. However, since it could also distract their processing of information, follow-up research is expected to uncover its potential contribution.

Overall, people perceived human interest framed news stories more favorably than non-human interest framed stories. In contrast to scholarly concerns about

personalization of medical advances, people did not consider human interest framing to be akin to distortion, bias, exaggeration, and sensationalism. Rather, people seemed to perceive that providing a patient's side of the story (e.g., personal experience and history) enables a higher quality of news stories about medical advances – e.g., greater credibility, trustworthiness, and accuracy. However, some cautions for using human interest framing can also be derived from the findings of this study. In response to human interest frames, the intensity of sympathy and parasocial interaction was positively related to news evaluation. With stronger sympathy and parasocial interaction, people evaluated the news stories more positively. However, the degree to which an individual emphasized with a patient in the news was associated with negative evaluation of news. Although an increase in audience involvement caused positive evaluation of news, the intensity of empathy suppressed the impact of audience involvement. The more they empathized with an exemplar, the more negatively they evaluated the news in both dimensions of news evaluation (i.e., news believability, news distortion). This implies that an exemplar that overemphasizes emotional aspects and forces viewers to be drawn into emotional sharing may backfire. Moreover, none of identification dimensions mediated the effect of audience involvement on perceived complexity of news, which means that such emotional engagement with an exemplar does not in fact guarantee audiences' motivation to understand the complicated health information. Understanding health information from a human interest framed news story seems fairly independent from emotional engagement with an exemplar in the new story. In this respect, emotion-appealing exemplars may provide no benefit, but may provoke negative public perception of health news. Health journalists need to consider adjusting the intensity of dramatic elements of

the exemplar in order to strike a balance between an increase in audience identification or involvement and negative outcomes.

In relation to the health news stories focusing on personalization and human drama, scholars discussed news content specifically targeting female audiences and its potential consequences. For example, MacDonald (2005) showed human-oriented narrative patterns using concrete and active words in reporting medical information in women's magazines. Andsager and Powers (1999) also showed that, when reporting on cancer, women's magazines were more likely than general news magazines to involve personal stories emphasizing a patient's survival or coping experience. Andsager and Powers (1999) presumed that news presentation of first-person stories may encourage readers to take active disease-preventive actions as well as possibly make them afraid of diseases at the same time. As addressed above, this study supported the idea that the degree to which individuals identify with an exemplar in the news story is associated with the consequences of news exposure. If it holds true that femininity is coupled with a tendency to identify with another person, this obviously raises a question about the relative impact of human interest framing on female viewers as opposed to male viewers. Therefore, although not hypothesized, this study additionally probed gender difference and found some significant interaction between news frame and gender. In short, as speculated, the influence of human interest framing was greater for females than males in positive news evaluation and positive perception of the depicted medical advances/research. Females were far more favorable than males about human interest framed news stories and the medical advances/research illustrated in the stories. However, responses to non-human interest framed news stories were not different between the two

77

gender groups. Thus, human interest framing seems more appealing to female viewers of television health news. Alternatively, it is also possible that females were more favorable about human interest frames because they were used to that type of news framing. What should be considered is that, because of their nature, females may be more vulnerable to the side effects of human interest frames, and journalists should be more cautious when they target female audiences by using human interest framing.

In addition, individuals' levels of health consciousness alone also positively influenced how much people were involved in television health news stories. This result corresponds to the previous studies, which demonstrated consistent attention to and active seeking and using of health information from diverse sources among health-conscious individuals (Dutta-Bergman, 2005, 2006; Furnham & Forey, 1994; Gould, 1990; Hong, 2009; Kaskutas & Greenfield, 1997). The extent to which individuals are aware of health-promoting behaviors and willing to engage in healthy behaviors was also influenced by their health consciousness level. Because there was no influence of news frame found in this aspect, this study again supports the idea that perception of healthy behaviors is rather a stable belief that has been cultivated and accumulated through lifetime experiences, which corresponds to the nature of health consciousness. Thus, it might be useful to develop health promotion programs/interventions through diverse channels, which aim to improve individuals' overall health consciousness in the long term if a primary objective of communication is individuals' behavioral changes.

Overall, the influence of health consciousness did not outweigh that of news frames in information processing involving such a short term exposure to television news. Only one additional interaction effect between health consciousness and news frame was

found in terms of the intensity of negative emotion. While the medium group reported the greatest negative emotion to both a human and a non-human interest frame, the pattern flipped between high and low health-conscious groups. The high group expressed greater negative emotion to the non-human interest frame, but the low group reported greater negative emotion to the human interest frame. The responses from the low health consciousness group are important because their responses probably can provide valuable insights in creating messages targeting populations at greater health risk. One possible explanation is that low health-conscious individuals may have negatively reacted to the emotion-appealing elements of human interest framing because they found these overwhelming and irrelevant to themselves. Subsequent reactance to or denial of news content also seems plausible among low health-conscious people. On the other hand, high health-conscious individuals reacted negatively to non-human interest frames because they prefer more comprehensive reports with diverse perspectives, such as one from a patient. However, the interpretation is highly limited with the current measures relying on the retrospective self-reports using a semantic bag of words. More sophisticated measures through a psycho-physiological experiment or a perception analyzer program would be beneficial to unfold this complicated result.

Practical implications

The importance of human interest framing has been reiterated by health journalists through several surveys (e.g., Hinnant & Len-Rios, 2009; Tanner, 2004). Unlike the expectation to observe a lot of human interest frames, however, not many health news stories from local television channels were found to employ a human interest

frame. Most of the health news stories were too short to contain a personal exemplification. Previous studies showed that health news stories from local television are relatively brief, with most lasting less than a minute,[13] and in particular, news stories about research findings and new medical products were even shorter than other topics of health and medicine (Wang & Gantz, 2007, 2010). In addition, compared to other news outlets (e.g., magazines, newspapers), television news was less likely to employ personal exemplifications because of its brief nature (Zillmann & Brosius, 2000).[14] In this regard, the pool of health news stories archived by the digital news capturing device from which news stimuli were drawn paralleled the pattern of those nation-wide television news samples from previous research. A preliminary analysis of health news stories in the digital archive showed that about 60% of 416 news stories lasted less than 30 seconds. Also, out of 26 news stories about medical advances collected, only four stories employed a human exemplar. If such short news stories and stories with no exemplars keep dominating television health news, it will become harder to engage television viewers with health news stories. It may even hamper the viewers' learning and interest in health and medicine. Nevertheless, it should also be noted that audiences probably are used to that type of news story. More comprehensive examination in a reasonable timeframe is expected for quality audience involvement in the news stories.

As for using exemplars in television news, Zillmann and Brosius (2000) showed an interesting observation. The ratio between supporting and challenging exemplars in television news was 9:1, which means that most of the exemplars were supportive for the

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[13] A half of health news stories were less than 30 seconds in length, and a quarter of them were between 30 seconds and 1 minute (Wang & Gantz, 2010).
[14] About a half of television news (47%) turned out not to have an exemplar while the other half (53%) contained one or more exemplars in news stories (Zillmann & Brosius, 2000).

focus of news reports. Likewise, the exemplars in the news stimuli in the current study were all supporting exemplars who highlighted the positivity of the medical achievement. Zillmann and Brosius (2000) attributed this trend to the limited number of exemplars used in television news. Television news does not have many chances to employ exemplars because it pursues brevity, and thus, news producers tend to pick a supporting exemplar when they need one. On other hand, it was known that the ratio between the supporting and challenging exemplars in print news was 7:3, indicating greater balance in reporting a topic in print news in terms of the use of exemplars (Zillmann & Brosius, 2000). Particularly in regard to news stories about medical advances, journalists are not likely to obtain a second (probably opposing) opinion from another researcher/expert (Entwistle, 1995). Under this circumstance, it should be considered that television news has a greater chance to bear bias, distortion, and/or exaggeration in reporting the event when it employs a single supporting exemplification.

This study also points out that a number of news reports on medical advances, such as brand new drugs and medical devices, are sponsored by research institutions and other relevant organizations (e.g., hospitals, professional medical associations) that want to promote their achievements. The influence of sponsorship in health news production (e.g., providence of news topics and information sources for the story) has been reported in previous studies (Andsager & Powers, 1999; Tanner, 2004). Tanner (2004) criticized that sponsored news coverage is highly vulnerable to bias, especially in local television news, because of a "passive news discovery process" among health journalists (Tanner, 2004, p. 360). The sponsorship from government agencies, research organizations, and companies in industry may help health journalists overcome the hardships in news

production (e.g., limited budget and other resources, lack of background knowledge) (Tanner, 2004). However, at the same time, local television may shift gears toward explanatory journalism while minimizing its role in critical journalism. Such a trend also seems relevant to the close journalist-source connection in areas involving high-tech information (Miller et al., 2006; Miller & Kimmel, 2001; Priest, 1990). The "breakthrough syndrome," which implies the media's exaggerated portrayals of scientific research findings with lack of safety evidence, could have resulted from such conventions – sponsorship and symbiotic journalist-source relationships – in medical (or science) journalism. From the sponsor's perspective, human interest framing may give the sponsor a great advantage to engage news audiences with its story. However, it is believed that journalists should keep in mind that the use of human interest framing in health news stories, including these sponsored ones, may distort the news presentation to a greater extent by substantially ignoring critical downsides or limitations associated with the advances. In addition, based on the amplified positive emotions to human interest frames found in this study, concerns about the news coverage intensifying false hope and unrealistic expectation (e.g., Cohen, 1997) can be critical in human interest framed news reports.

Now is an opportune time to explore the influence of television news about medical advances on viewers given the increasing media coverage of medical advances and the increasing participation of scientific/medical communities and research organizations in the news production. The close source-journalist relationship and highly sophisticated medical information make this type of news coverage more worthy of investigation. More notably, news stories about medical advances are important because

they help news viewers make informed decision regarding their health. A previous study pinpointed that medical coverage of health issues is likely to emphasize practical guidelines over scientific research/knowledge based on scientific evidence, and what the public knows tends to correspond to what news media report, rather than the actual state of medical research (Chew et al., 2006). That is why even a single news story should be carefully reported. Chew et al. (2006) stated that, "To make informed decisions about their own health care, the public needs to understand benefits and risks of drug therapies, surgical procedures, diagnostic tests and screening, and their relative and absolute outcomes" (p. 333). They emphasized that news media should be in charge of providing sufficient information and insight (both benefits and uncertainties) about state-of-the-art medical research and helping the public make informed decisions associated with medical treatment and disease prevention (Chew et al., 2006). This study showed that human interest framing has a great potential to improve health literacy and enhance health-related decision making among television news audiences by increasing audience involvement in the news story. However, at the same time, it should be kept in mind that human interest framing also bears the potential to distort the medical event and public perceptions of relevant real-world trends. In particular, it might be more problematic, as Jensen et al. (2010) warned, if a person with huge public impact (e.g., a celebrity) is exemplified in a news story to advocate medical information that is not verified by scientific evidence. Not only may this distort the event but it also may hinder news accuracy. In this regard, it is expected that valuable insights in journalistic norm or policy will emerge once more research findings are accumulated in this line of research on human interest framing.

Limitations of the study

This study showed the influence of news frames, and other message attributes were not controlled in the experiment. Although multiple messages were used for each condition to counterbalance the uncontrolled message features, it is possible that another major component of news stories has hindered the meaningful interpretation of the results. For example, the length of news stories varied a bit, even after editing. Particularly in the pool of news stories about medical advances, those without an exemplar tended to be much shorter than those with exemplars in general, which was consistent with Zillmann and Brosius's (2000) observation (an average of 45 seconds vs. 139 seconds). The difference in length seems logical because news stories in a human interest frame should contain exemplars and personal anecdotes on top of scientific information about medical advances. However, length of news stories may have influenced the results because, as mentioned above, a lengthy news story may allow audiences better opportunities for a higher level of involvement in and emotional engagement with the news, and a relatively short news story (usually in a non-human interest frame) may have prevented audience involvement.

There were some measurement issues in this study. First, as mentioned earlier, four discrete emotions (hope, anger, fear, relief) were measured with a twelve-item scale. However, these measures did not specify the origin of emotion, and it was especially problematic in analyzing negative emotions – fear and anger. In other words, when a person indicated that s/he was very angry, the response did not clarify why s/he felt that way. Is it from anxiety about the poor quality of news? Is it because of the disgusting

visuals? Or is it because they did not like the topic or tone of the news story? The answer is wide open, and the current measures do not reflect this aspect. In this regard, the application of Dunlop et al.'s categories (2008) – self-referent, plot-referent, and message-referent emotional response to health messages – to the current investigation on emotions could have helped better unfold such complexity.

Next, in measuring how respondents think about the news stories they watched, this study presented several sets of adjectives. The items of news believability included "untrustworthy-trustworthy," "not convincing-convincing," "not credible-credible," and so forth. This study asked respondents to indicate their opinion about the overall news story, but it would have provided deeper insight if their evaluation could clarify the object; for example, evaluation of source (expert) in the news story, evaluation of journalist who reported the story, and evaluation of information *per se*. In fact, while examining the effects of hedging in news coverage of cancer, Jensen (2008) specified scientist credibility and journalist credibility separately. Such an approach would help offer more specific practical guidelines for health journalists and information sources.

Nevertheless, this study provides a significant contribution to the field of health communication and medical journalism. Human interest framing – providing human exemplars and their personal anecdotes – has been utilized in news production and regarded as a major journalistic technique for a long time. However, its impact has been rarely tested in an empirical way. By conducting an experiment, this study tried to shed light on the potential causal effects of news frames. Also, it articulated the internal mechanisms by which a human interest frame works, as explicating the mediation and moderated mediation through affective responses to the news stories. Moreover, this

study derived a more comprehensive picture of health information processing by looking at the interaction between a message feature (i.e., news frame) and an individual trait (i.e., health consciousness).

Suggestions for future research

From a theoretical perspective, this study incorporated the concept of identification as it explicates the underlying route of exemplification theory. However, future research may extend exemplification theory by carefully investigating the two types of heuristics (i.e., representative heuristic, availability heuristic). For example, Zillmann and Brosius (2000) explained one case in which an exemplar is from unknown population and another case in which it is from a known population. The actual or perceived size of the population may also matter when people process an exemplar heuristically. In the current investigation, a patient who benefited from a new CT scanner could be one of the unknown population because of the device's wide utility (e.g., heart disease, etc.). However, a population of beneficiaries of a new spine surgery technique may be relatively limited and known. A future study is expected to probe this type of mental process and its impact in processing health messages with exemplars.

This study distinguished the presence of a human exemplar from its absence as it manipulates news frames (i.e., human interest framing vs. non-human interest framing). However, with a wide pool of adequate news stimuli, future research may test the influence of the emotional intensity (e.g., high vs. low) or valence (e.g., positive vs. negative) of the employed exemplar. This will contribute to elaborating the notion of "affective reactivity" in exemplification theory (Aust & Zillmann, 1996; Zillmann, 2006;

86

Zillmann & Brosius, 2000). All of the verbal, facial, and contextual cues surrounding the exemplar may help researchers manipulate the experimental condition. For example, examining the effects of victim exemplification, Aust and Zillmann (1996) contrasted a high emotional condition (in which exemplars use fierce words, speak in an emotionally charged, excited or agitated tone, present a dramatic/tragic story, and express their emotion through facial expressions and hand gestures) with a low emotional condition (in which exemplars act in a calm/reserved manner and are detached from emotional expression and share a relatively ordinary story). Applying such elaboration to beneficiary exemplification, as opposed to victim exemplification, in health news stories about medical advances is expected to offer richer insights and interesting contrasts in the context of exemplification theory.

Investigation of other characteristics associated with human exemplars would provide better understanding of the influence of human interest framing. The current experiment used four news stories that exemplified patients with varied demographics in terms of gender (i.e., two males and two females) and age (i.e., one teenager, two middle-aged individuals, and one elderly patient). By doing so, this study expected the selected news stories to induce varied levels of emotional engagement (or identification) with the exemplars. However, there are other things to consider beyond exemplars' demographics. For example, would a news story about a lung cancer treatment be perceived favorably if an exemplar has been smoking for 30 years? Stigma associated with a patient or a disease would be a factor worthy of investigation. An experiment that manipulates such characteristics of exemplars would provide more insights into this area of research.

Another factor that should be considered is the type of medical advance/research or characteristics of diseases depicted. In a post-hoc analysis (not reported here), while the human interest frame was more influential than the non-human interest frame across news stimuli, news stories about treatment advances (e.g., surgical procedure, implantable pain device) were less likely than news stories about detection/diagnosis (e.g., CT scanner, colonoscopy) to generate positive perceptions of the described medical development (i.e., interaction between news frame and type of medical advances). It seems reasonable that the participants in this study were in fairly good physical condition, and thus, medical advances involving disease detection/diagnosis were more relevant to the participants than those involving disease treatment/cure. Likewise, probing additional features akin to the type of research or characteristics of disease will improve the predictability surrounding this phenomenon.

Moreover, investigating the impact of health news along with other message features and individual properties will provide a more comprehensive picture. For message features, Hinnant and Len-Rios (2009) identified a few journalistic techniques to improve audience comprehension of health information other than a human interest angle; they included the use of medical experts or authorities, definition/wording, data and statistics, mobilizing information, visual supplements (e.g., photos, illustrations, infographics), added context, conversational tone, and verbal device (e.g., metaphors, analogies). All of these are potential independent variables to test the effectiveness of news stories/articles. As for individual traits, this study suggests level of health literacy as a focal factor that may influence one's health news processing. Given the nature of health news employing sophisticated scientific information, it seems prudent to examine one's

basic health/medical knowledge and ability to integrate the knowledge into one's life

decision. Thus, this is a potentially powerful contributor to the influence of audiences'

responses to health news stories.

This study made a small step to explicate this complicated phenomenon. As

indicated in the beginning, this study focused on a subset of health news stories (i.e.,

stories about medical advances). Hence, generalization and interpretation of the findings

of this study should be made with some caution. Future research is expected to deepen

and widen the scope of this study.

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95

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Zillmann, D., & Gan, S.-l. (1996). Effects of threatening images in news programs on the perception of risk to others and self. *Medienpsychologie, 8*(4), 288-305.
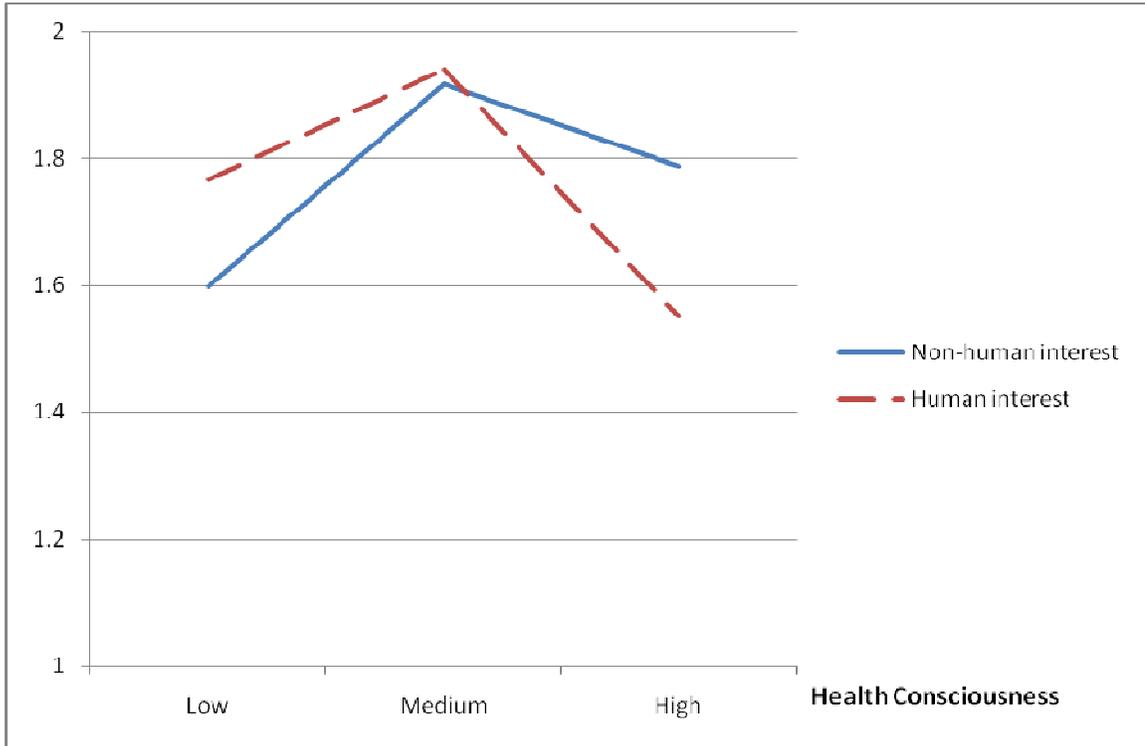
**Figure 1. Interaction between news frame and health consciousness
on negative emotion**
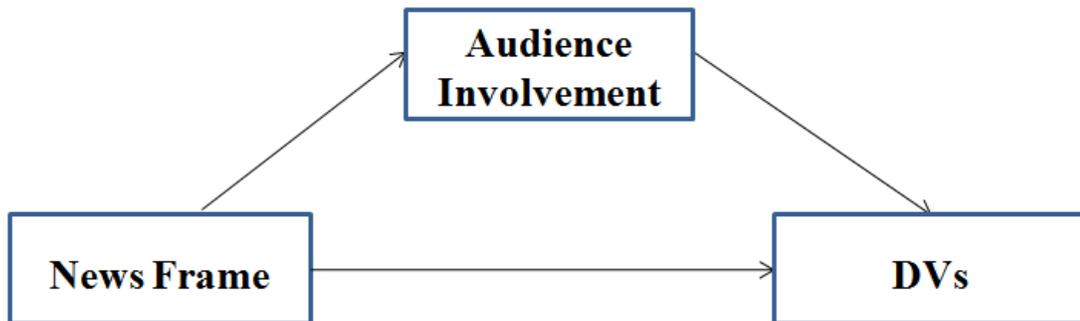
Figure 2a. Indirect effects of news frame mediated by audience involvement
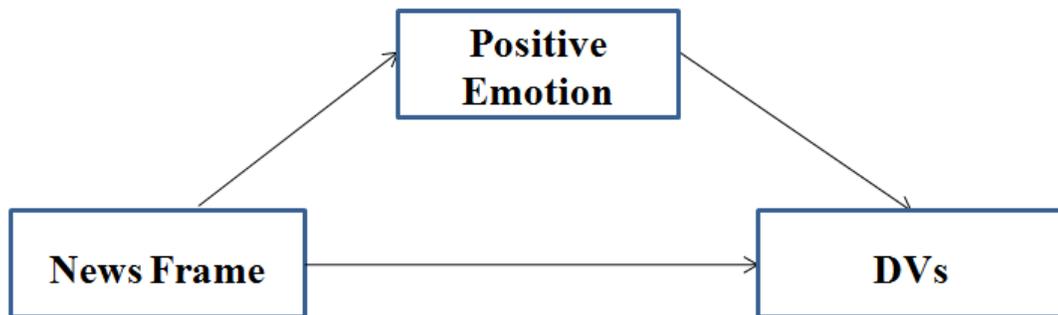
Figure 2b. Indirect effects of news frame mediated by positive emotion
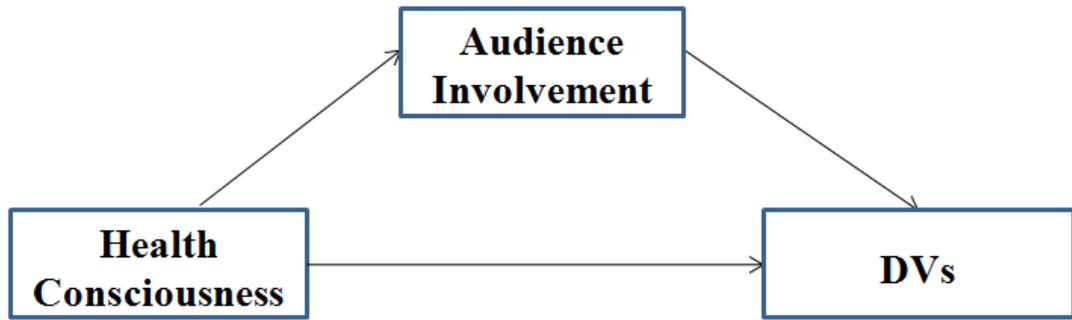
Figure 2c. Indirect effects of health consciousness mediated by audience involvement
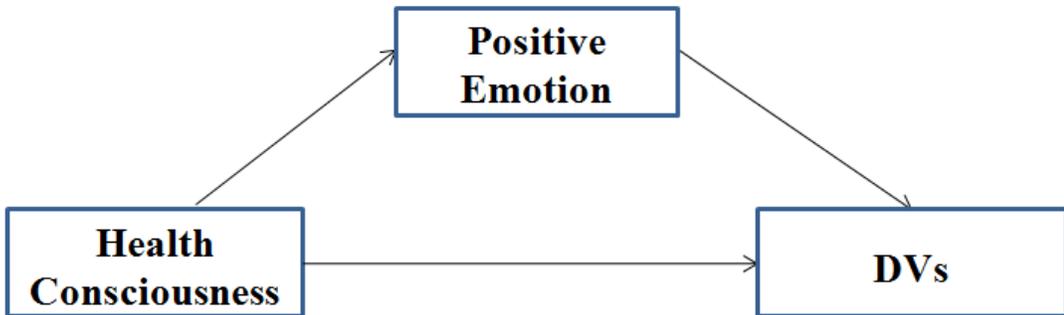
Figure 2d. Indirect effects of health consciousness mediated by positive emotion
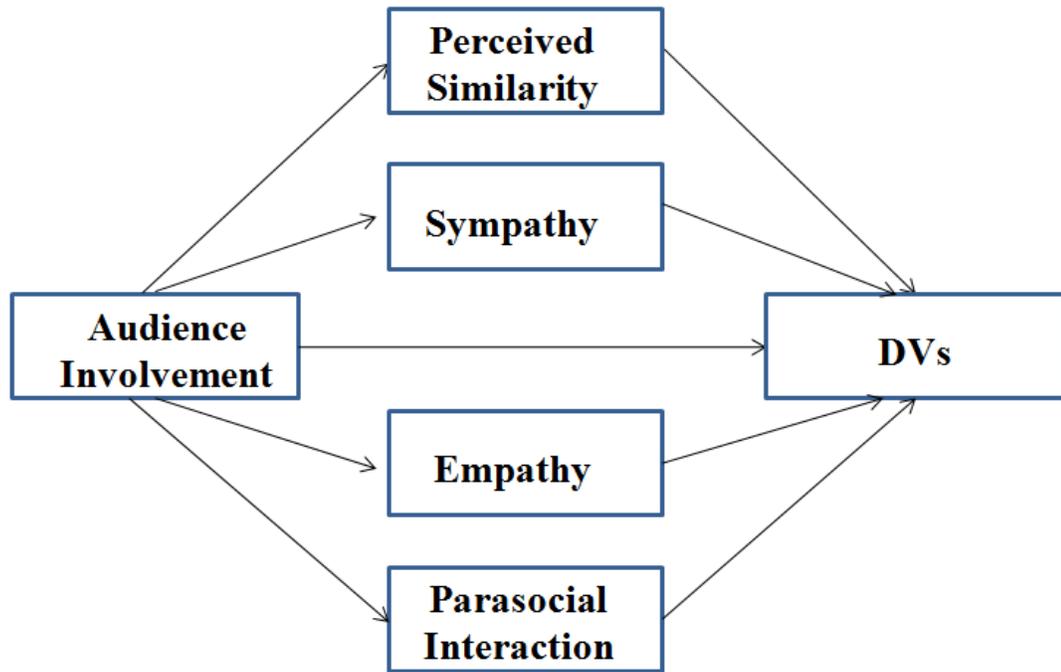
Figure 3. Indirect effects of audience involvement mediated by identification
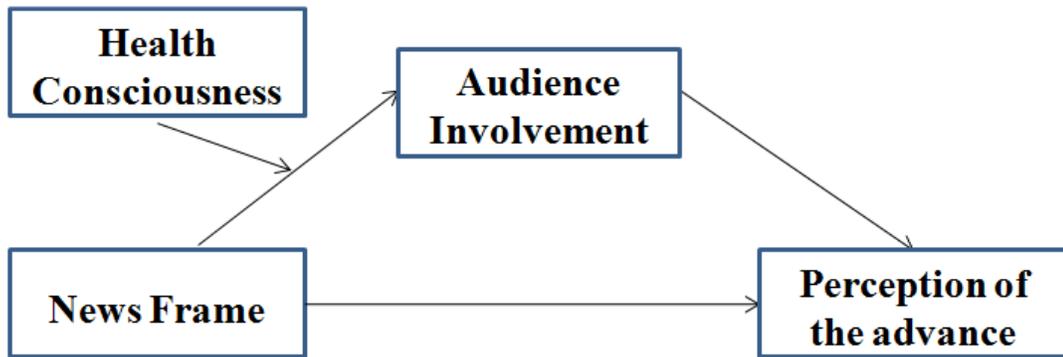
Figure 4. Conditional indirect effects of news frame through audience involvement moderated by health consciousness[*]

Note. IV=News frame (1=human interest frame; 0=non-human interest frame); Moderator=Health consciousness (1=low; 2=medium; 3=high); Mediator=Audience involvement (1 to 7); DV=Perception of medical advances/research presented in the news story (1 to 7); Covariate=Pre-existing attitude toward medical science/scientists (1 to 7).
[*]Adopted from Model 2 in Preacher et al. (2007)
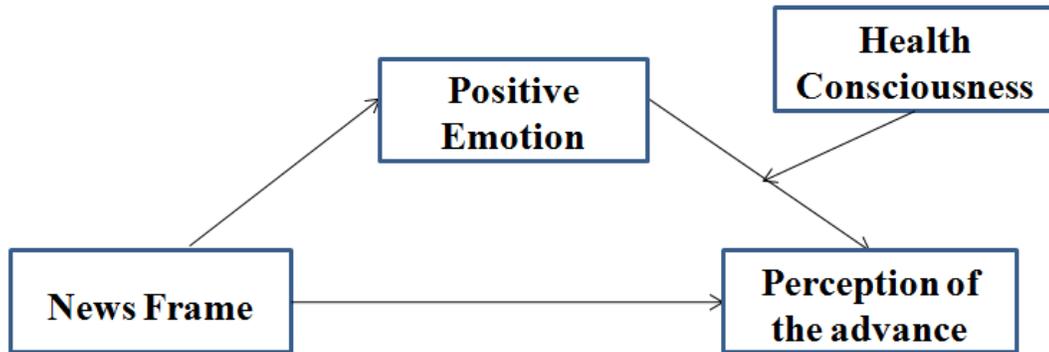
Figure 5. Conditional indirect effects of news frame through positive emotion moderated by health consciousness[*]
Note. IV=News frame (1=human interest frame; 0=non-human interest frame); Moderator=Health consciousness (1=low; 2=medium; 3=high); Mediator=Positive emotion (1 to 7); DV=Perception of medical advances/research presented in the news story (1 to 7); Covariate= Pre-existing attitude toward medical science/scientists (1 to 7).
[*]Adopted from Model 3 in Preacher et al. (2007)

Table 1. Main effects and interaction effects of news frames and health consciousness (Repeated measures ANOVAs)

DVs	Main effects of news frames		Main effects of HC		Interaction effects between news frame and HC	
	F-test (p-value)	Effect size (partial η^2)	F-test (p-value)	Effect size (partial η^2)	F-test (p-value)	Effect size (partial η^2)
Audience involvement (1 to 7)	$F(1, 95)=16.332$ ($p<.001$)	.147	$F(2, 95)=5.015$ ($p=.009$)	.095	$F(2, 95)=1.696$ ($p=.189$)	.034
News believability (1 to 5)	$F(1, 95)=42.726$ ($p<.001$)	.310	$F(2, 95)=.277$ ($p=.758$)	.006	$F(2, 95)=.043$ ($p=.957$)	.001
News distortion (1 to 5)	$F(1, 95)=2.047$ ($p=.156$)	.021	$F(2, 95)=.718$ ($p=.490$)	.015	$F(2, 95)=.069$ ($p=.934$)	.001
Understandability (1 to 5)	$F(1, 95)=75.629$ ($p<.001$)	.443	$F(2, 95)=.868$ ($p=.423$)	.018	$F(2, 95)=.375$ ($p=.688$)	.008
Perceptions of the medical advance (1 to 7)[†]	$F(1, 94)=3.975$ ($p=.049$)	.041	$F(2, 94)=.418$ ($p=.569$)	.009	$F(2, 94)=2.845$ ($p=.063$)	.057
Perceptions of individual healthy behaviors (1 to 7)	$F(1, 95)=.251$ ($p=.617$)	.003	$F(2, 95)=6.709$ ($p=.002$)	.124	$F(2, 95)=.419$ ($p=.659$)	.009
Positive emotion (1 to 7)	$F(1, 95)=42.732$ ($p<.001$)	.310	$F(2, 95)=1.780$ ($p=.174$)	.036	$F(2, 95)=.002$ ($p=.998$)	<.001
Negative emotion (1 to 7)	$F(1, 95)=.049$ ($p=.826$)	.001	$F(2, 95)=1.230$ ($p=.297$)	.025	$F(2, 95)=3.499$ ($p=.034$)	.069

Note. News frames (0=Non-human interest frame, 1=Human interest frame); Health consciousness (1=low; 2=medium; 3=high)

[†]Controlled for pre-existing attitude toward medical science (1 to 7), with a significant main effect ($F(1, 94)=77.830$, $p<.001$; *partial* η^2=.453) and insignificant interaction with news frame ($F(1, 94)=.938$, $p=.335$; *partial* η^2=.010).

Table 2. Group difference by news frame

DVs	Non-human interest frame (*S.D.*)	Human interest frame (*S.D.*)	*p*-value	Effect size (*partial η²*)
Audience involvement (1 to 7)	5.055 (1.037)	5.469 (.991)	*p*<.001	.147
News believability (1 to 5)	3.842 (.726)	4.251 (.621)	*p* <.001	.310
News distortion (1 to 5)	2.415 (.730)	2.325 (.730)	*p*=.156	.021
Understandability (1 to 5)	3.639 (.717)	4.183 (.588)	*p* <.001	.443
Perceptions of the medical advance (1 to 7) [†]	4.832 (1.217)	5.446 (1.028)	*p* =.049	.041
Perceptions of individual healthy behaviors (1 to 7)	6.085(.964)	6.112 (.910)	*p* =.617	.003
Positive emotion (1 to 7)	3.605 (1.338)	4.338 (1.239)	*p* <.001	.310
Negative emotion (1 to 7)	1.773 (.804)	1.759 (.858)	*p* =.826	.001

Note. [†]Controlled for pre-existing attitude toward medical science as a covariate.

Table 3. Audience involvement by news frame and level of health consciousness

News frames	HC Low	Medium	High	Total
Non-human interest	4.706 (.821)	4.911 (1.084)	5.551 (1.011)	5.055 (1.037)[a]
Human interest	5.218 (.798)	5.482 (1.090)	5.700 (1.019)	5.469 (.991)[a]
Total	4.917 (.663)[b]	5.196 (.978)	5.625 (.845)[b]	5.262 (.879)

Note. HC=Health consciousness; *Mean* (*S.D.*); [a]*p*<.001; [b]*p*<.01.

Table 4. Direct and indirect effects of news frames

Mediators	DVs	Direct and total effects	Path coefficient (SE)	Model fit (R^2)	Indirect effect Path coefficient (SE)	Indirect effect BC Bootstrap 95% Confidence interval
Audience involvement (1 to 7)	News believability (1 to 5)	IV → mediator	.4207 (.1292)***	.2352***	.1087 (.0342)	(.0416, .1780)
		Mediator → DV	.2561 (.0290)***			
		IV → DV (Direct)	.3235 (.0732)***			
		IV → DV (Total)	.4312 (.0793)***			
	News distortion (1 to 5)	IV → mediator	.4207 (.1292)***	.0510***	-.0636 (.0226)	(-.1108, -.0238)
		Mediator → DV	-.1516 (.0350)***			
		IV → DV (Direct)	-.0289 (.0883)			
		IV → DV (Total)	-.0927 (.0891)			
	Understandability (1 to 5)	IV → mediator	.4207 (.1292)***	.2742***	.1203 (.0372)	(.0519, .1926)
		Mediator → DV	.2855 (.0308)***			
		IV → DV (Direct)	.4400 (.0776)***			
		IV → DV (Total)	.5601 (.0849)***			
	Perceptions of the medical advance (1 to 7)†	IV → mediator	.4207 (.1292)***	.4350***	.1083 (.0375)	(.0426, .1912)
		Mediator → DV	.2599 (.0425)***			
		IV → DV (Direct)	.5412 (.1016)***			
		IV → DV (Total)	.6616 (.1282)***			
	Perceptions of individual healthy behaviors (1 to 7)	IV → mediator	.4207 (.1292)***	.1644***	.1391 (.0490)	(.0579, .2541)
		Mediator → DV	.3296 (.0390)***			
		IV → DV (Direct)	-.1008 (.0984)			
		IV → DV (Total)	.0379 (.1058)			

Note. News frames: 0=Non-human interest frame, 1=Human interest frame; *** $p<.001$, ** $p<.01$, * $p<.05$; BC=bias corrected; 1,000 bootstrap samples; Confidence interval is provided in bootstrapping analysis.

†Controlled for pre-existing attitude toward medical science (covariate, 1 to 7), with an insignificant IV–covariate path (*path coefficient*=.0159, *SE*=.0902, *p*>.05) and a significant covariate–DV path (*path coefficient*=.7005, *SE*=.0609, *p*<.001).

Table 5. Direct and indirect effects of news frames (Cont.)

Mediators	DVs	Direct and total effects	Path coefficient (SE)	Model fit (R²)	Indirect effect Path coefficient (SE)	Indirect effect BC Bootstrap 95% Confidence interval
Positive emotion (1 to 7)	News believability (1 to 5)	IV → mediator	.7399 (.1525)***	.1930***	.1384 (.0332)	(.0782, .2105)
		Mediator → DV	.1863 (.0253)***			
		IV → DV (Direct)	.2934 (.0764)***			
		IV → DV (Total)	.3412 (.0793)***			
	News distortion (1 to 5)	IV → mediator	.7399 (.1525)***	.0645***	.1072 (.0297)	(-.1724, -.0536)
		Mediator → DV	-.1452 (.0295)***			
		IV → DV (Direct)	.0148 (.0891)			
		IV → DV (Total)	-.0927 (.0891)			
	Understandability (1 to 5)	IV → mediator	.7399 (.1525)***	.1999***	.1348 (.0321)	(.0788, .2039)
		Mediator → DV	.2292 (.0365)***			
		IV → DV (Direct)	.4262 (.0829)***			
		IV → DV (Total)	.5601 (.0849)***			
	Perceptions of the medical advance (1 to 7)†	IV → mediator	.7399 (.1525)***	.4379***	.1796 (.0821)	(.0933, .2680)
		Mediator → DV	.2292 (.0365)***			
		IV → DV (Direct)	.4812 (.1033)***			
		IV → DV (Total)	.6616 (.1282)***			
	Perceptions of individual healthy behaviors (1 to 7)	IV → mediator	.7399 (.1525)***	.1644***	.1312 (.0409)	(.0667, .2286)
		Mediator → DV	.1782 (.0349)***			
		IV → DV (Direct)	-.0939 (.1056)			
		IV → DV (Total)	.0379 (.1058)			

Note. News frames: 0=Non–human interest frame, 1=Human interest frame; **** $p<.001$, *** $p<.01$, * $p<.05$; BC=bias corrected; 1,000 bootstrap samples; Confidence interval is provided in bootstrapping analysis.

†Controlled for pre-existing attitude toward medical science (covariate, 1 to 7), with an insignificant IV–covariate path (*path coefficient*=.0159, *SE*=.0902, *p*>.05) and a significant covariate–DV path (*path coefficient*=.6791, *SE*=.0617, *p*<.001).

Table 6. Direct and indirect effects of health consciousness

Mediators	DVs	Direct and total effects	Path coefficient (SE)	Model fit (R^2)	Indirect effect Path coefficient (SE)	Indirect effect BC Bootstrap 95% Confidence interval
Audience involvement (1 to 7)	News believability (1 to 5)	IV → mediator	.3288 (.0801)***	.1953***	.0934 (.0233)	(.0500, .1432)
		Mediator → DV	.2807 (.0300)***			
		IV → DV (Direct)	-.0236 (.0473)			
		IV → DV (Total)	.0687 (.0514)			
	News distortion (1 to 5)	IV → mediator	.3288 (.0801)***	.0508***	.0507 (.0166)	(-.0933, -.0245)
		Mediator → DV	-.1541 (.0353)***			
		IV → DV (Direct)	.0045 (.0557)			
		IV → DV (Total)	-.0462 (.0557)			
	Understandability (1 to 5)	IV → mediator	.3288 (.0801)***	.2115***	.1034 (.0255)	(.0552, .1616)
		Mediator → DV	.3179 (.0324)***			
		IV → DV (Direct)	-.0248 (.0510)			
		IV → DV (Total)	.0797 (.0559)			
	Perceptions of the medical advance (1 to 7)†	IV → mediator	.3288 (.0801)***	.3920***	.0926 (.0004)	(.0510, .1642)
		Mediator → DV	.2958 (.0438)***			
		IV → DV (Direct)	.0399 (.0683)			
		IV → DV (Total)	.3484 (.0810)***			
	Perceptions of individual healthy behaviors (1 to 7)	IV → mediator	.3288 (.0801)***	.2086***	.0946 (.0289)	(.0463, .1626)
		Mediator → DV	.2849 (.0382)***			
		IV → DV (Direct)	.2872 (.0603)***			
		IV → DV (Total)	.3809 (.0631)***			

Note. Health consciousness: 1=low, 2=medium, 3=high; ****$p<.001$, ***$p<.01$, *$p<.05$; BC=bias corrected; 1,000 bootstrap samples; Confidence interval is provided in bootstrapping analysis.

†Controlled for pre-existing attitude toward medical science (covariate, 1 to 7), with a significant IV–covariate path (*path coefficient*=.3123, *SE*=.0540, *p*<.001) and covariate–DV path (*path coefficient*=.6762, *SE*=.0650, *p*<.001).

Table 7. Direct and indirect effects of health consciousness (Cont.)

Mediators	DVs	Direct and total effects	Path coefficient (SE)	Model fit (R²)	Indirect effect Path coefficient (SE)	Indirect effect BC Bootstrap 95% Confidence interval
Positive emotion (1 to 7)	News believability (1 to 5)	IV → mediator	.2365 (.0976)*	.1612****	.0484 (.0193)	(.0145, .0915)
		Mediator → DV	.2088 (.0252)***			
		IV → DV (Direct)	.0193 (.0476)			
		IV → DV (Total)	.0687 (.0514)			
	News distortion (1 to 5)	IV → mediator	.2365 (.0976)*	.0646***	.0342 (.0137)	(-.0625, -.0074)
		Mediator → DV	-.1432 (.0288)***			
		IV → DV (Direct)	-.0123 (.0545)			
		IV → DV (Total)	-.0462 (.0557)			
	Understandability (1 to 5)	IV → mediator	.2365 (.0976)*	.1433****	.0516 (.0209)	(.0113, .0920)
		Mediator → DV	.2134 (.0277)***			
		IV → DV (Direct)	.0293 (.0524)			
		IV → DV (Total)	.0797 (.0559)			
	Perceptions of the medical advance (1 to 7)†	IV → mediator	.2365 (.0976)*	.4074***	.0649 (.0256)	(.0185, .1180)
		Mediator → DV	.2719 (.0362)***			
		IV → DV (Direct)	.0866 (.0669)			
		IV → DV (Total)	.3484 (.0810)***			
	Perceptions of individual healthy behaviors (1 to 7)	IV → mediator	.2365 (.0976)*	.1371***	.0363 (.0179)	(.0084, .0779)
		Mediator → DV	.1477 (.0328)***			
		IV → DV (Direct)	.3460 (.0620)***			
		IV → DV (Total)	.3809 (.0631)***			

Note. Health consciousness: 1=low, 2=medium, 3=high; ****$p<.001$, ***$p<.01$, *$p<.05$; BC=bias corrected; 1,000 bootstrap samples; Confidence interval is provided in bootstrapping analysis.

†Controlled for pre-existing attitude toward medical science (covariate, 1 to 7), with a significant IV–covariate path (*path coefficient*=.3123, *SE*=.0540, *p<*.001) and covariate–DV path (*path coefficient*=.6323, *SE*=.0650, *p<*.001).

Table 8. The influence of audience involvement through the mediation of identification

DVs	Mediators	Path coefficient (SE) IV→Mediator	Path coefficient (SE) Mediator→DV	Bootstrap coefficient (SE)	BC Bootstrap CI 95% CI	Direct and total effects & Model fit
News believability	Similarity	.2266 (.0920)*	.0518 (.0481)	.0121 (.0122)	(-.0038, .0474)	Direct:.2100 (.0376)***
	Sympathy	.3970 (.0643)***	.1253 (.0439)**	.0486 (.0208)	(.0111, .0943)	Total:.2750 (.0359)***
	Empathy	.2196 (.0920)*	-.1929 (.0526)***	-.0427 (.0223)	(-.0971, -.0102)	R^2=.3430
	Parasocial	.3701 (.0774)***	.1242 (.0537)*	.0456 (.0221)	(.0094, .1002)	
	TOTAL			.0638 (.0214)	(.0269, .1099)	
News distortion	Similarity	.2266 (.0920)*	-.0870 (.0689)	-.0215 (.0212)	(-.0767, .0106)	Direct:-.1279 (.0539)*
	Sympathy	.3970 (.0643)***	-.0078 (.0629)	-.0049 (.0257)	(-.0584, .0466)	Total: -.1624 (.0494)**
	Empathy	.2196 (.0920)*	.2462 (.0754)**	.0552 (.0310)	(.0094, .1379)	R^2=.1152**
	Parasocial	.3701 (.0774)***	-.1779 (.0770)*	-.0643 (.0306)	(-.1520, -.0176)	
	TOTAL			-.0354 (.0283)	(-.0904, .0208)	
Understandability	Similarity	.2266 (.0920)*	.0266 (.0480)	.0047 (.0140)	(-.0160, .0445)	Direct:.3545 (.0375)***
	Sympathy	.3970 (.0643)***	.0671 (.0438)	.0294 (.0218)	(-.0084, .0756)	Total:.2970 (.0340)***
	Empathy	.2196 (.0920)*	-.0697 (.0524)	-.0148 (.0141)	(-.0591, .0030)	R^2=.3208***
	Parasocial	.3701 (.0774)***	.0681 (.0536)	.0238 (.0215)	(-.0132, .0757)	
	TOTAL			.0431 (.0198)	(.0050, .0839)	
Perceptions of the medical advance	Similarity	.2266 (.0920)*	.0303 (.0790)	.0072 (.0187)	(-.0216, .0616)	Direct:.3049 (.0618)***
	Sympathy	.3970 (.0643)***	.2910 (.0721)***	.1162 (.0380)	(.0459, .1942)	Total:.4278 (.0582)***
	Empathy	.2196 (.0920)*	-.0549 (.0864)	-.0123 (.0206)	(-.0656, .0242)	R^2=.3127***
	Parasocial	.3701 (.0774)***	.0340 (.0883)	.0125 (.0318)	(-.0562, .0719)	
	TOTAL			.1236 (.0399)	(.0508, .2061)	
Perceptions of individual healthy behaviors	Similarity	.2266 (.0920)*	-.0243 (.0692)	-.0061 (.0153)	(-.0502, .0179)	Direct:.2539 (.0541)***
	Sympathy	.3970 (.0643)***	.1998 (.0632)**	.0802 (.0291)	(.0320, .1480)	Total:.3415 (.0503)***
	Empathy	.2196 (.0920)*	-.1029 (.0757)	-.0236 (.0218)	(-.0875, .0067)	R^2=.2691***
	Parasocial	.3701 (.0774)***	.0983 (.0773)	.0375 (.0294)	(-.0163, .1000)	
	TOTAL			.0881 (.0292)	(.0407, .1634)	

Positive emotion					
Similarity	.2266 (.0920)*	-.0330 (.0971)	-.0069 (.0216)	(-.0611, .0267)	Direct: .4476 (.0759)***
Sympathy	.3970 (.0643)***	.2472 (.0886)**	.0980 (.0434)	(.0125, .1862)	Total: .5813 (.0711)***
Empathy	.2196 (.0920)*	.1249 (.1062)	.0268 (.0298)	(-.0150, .1092)	R^2=.3405***
Parasocial	.3701 (.0774)***	.0422 (.1085)	.0159 (.0375)	(-.0629, .0855)	
TOTAL			.1338 (.0442)	(.0547, .2322)	

Note. *** $p<.001$, ** $p<.01$, * $p<.05$; BC-bias corrected; 1,000 bootstrap samples; Confidence interval is provided in bootstrapping analysis.

Table 9. Conditional indirect effects of news frames through audience involvement moderated by health consciousness

	MEDIATOR VARIABLE MODEL			
Predictor	*β (path coefficient)*	*SE*	*t*	*P*
Constant	2.2623	.4179	5.4131	.0000
News frames	.7969	.3280	2.4295	.0156
Health consciousness	.2977	.1099	2.7084	.0071
News frames × HC	-.1908	.1519	-1.2561	.2099
Pre-attitude	.4051	.0732	5.5376	.0000
	DEPENDENT VARIABLE MODEL			
Predictor	*β (path coefficient)*	*SE*	*t*	*p*
Constant	-.0603	.3558	-.1696	.8654
Audience involvement	.2619	.0428	6.1254	.0000
News frames	-.0165	.2708	-.0607	.9516
Health consciousness	-.0913	.0909	-1.0043	.3159
News frames × HC	.2777	.1247	2.2269	.0266
Pre-attitude	.6875	.0624	11.0225	.0000
	Conditional indirect effect range of values of the moderator(s)[a]			
HC	Indirect effect	*SE*	*z*	*p*
1.00	.1587	.0579	2.7407	.0061
2.00	.1088	.0368	2.9543	.0031
3.00	.0588	.0523	1.1229	.2615
	Conditional indirect effect range of values of the moderator(s)[b]			
HC	Indirect effect	*SE*	*z*	*P*
1.00	.1594	.0543	2.9333	.0034
2.00	.1089	.0365	2.9859	.0028
3.00	.0585	.0526	1.1127	.2658

Note. IV=News frame (1=human interest frame; 0=non-human interest frame); Moderator=HC (Health consciousness, 1=low; 2=medium; 3=high); Mediator=Audience involvement (1 to 7); DV=Perception of medical advances/research presented in the news story (1 to 7); Covariate=Pre-attitude (Pre-existing attitude toward medical science/scientists, 1 to 7).

[a]Indirect effect based on the Johnson-Neyman (N-J) technique; standard errors are second-order estimates.

[b]Indirect effect based on bootstrap estimates (number of bootstrap samples=3000); Bootstrap *p*-values assume normal bootstrap distribution.

Table 10. Conditional indirect effects of news frames through positive emotion moderated by health consciousness

Predictor	MEDIATOR VARIABLE MODEL			
	β (path coefficient)	SE	t	p
Constant	.2595	.4534	.5724	.5674
News frame	.7301	.1423	5.1298	.0000
Pre-existing attitude	.6141	.0820	7.4854	.0000
Predictor	DEPENDENT VARIABLE MODEL			
	β (path coefficient)	SE	t	p
Constant	1.1624	.4753	2.4456	.0149
News frame	.4876	.1024	4.7626	.0000
Positive emotion	-.0035	.0971	-.0362	.9712
HC	-.3509	.1832	-1.9150	.0563
Positive emotion × HC	.1123	.0437	2.5687	.0106
Pre-attitude	.6524	.0634	10.2901	.0000
HC	Conditional indirect effect range of values of the moderator(s)[a]			
	Indirect effect	SE	z	p
1.00	.0794	.0464	1.7109	.0871
2.00	.1614	.0414	3.8931	.0001
3.00	.2433	.0625	3.8931	.0001
HC	Conditional indirect effect range of values of the moderator(s)[b]			
	Indirect effect	SE	z	p
1.00	.0782	.0412	1.9000	.0574
2.00	.1609	.0404	3.9792	.0001
3.00	.2436	.0668	3.6461	.0003

Note. IV=News frame (1=human interest frame; 0=non-human interest frame); Moderator=HC (Health consciousness, 1=low; 2=medium; 3=high); Mediator=Positive emotion (1 to 7); DV=perception of medical advances/research presented in the news story (1 to 7); Covariate=Pre-attitude (Pre-existing attitude toward medical science/scientists, 1 to 7).

[a]Indirect effect based on the Johnson-Neyman (N-J) technique; standard errors are second-order estimates.

[b]Indirect effect based on bootstrap estimates (number of bootstrap samples=3000); Bootstrap *p*-values assume normal bootstrap distribution.

News Story #1 (Human Interest Frame)

Topic: CT scanner

Steve Gregier (heart bypass patient, male): It was a ticking time bomb. I was asymptomatic. This scan showed damage that, the only other way it would've been found otherwise was me having a massive heart attack and dying.

Reporter (female): Steve Gregier can smile and laugh about it now, but last year it was about as close to a life and death situation as anyone could come. Gregier volunteered to get a CT angiogram from Advanced Radiology of Columbia, to test its new 28-slice CT scanner. It's a cutting-edge piece of equipment that represents some big advances.

Doctor (male): This one is less radiation, it's faster, and we get a better image. We can do a heart in, you know, four or five seconds. You know, we can scan from here (points at head), you know, all the way down to your pelvis in fifteen or twenty seconds.

Reporter: A 128-slide scan is much less invasive than other tests doctors could order to get the same information about your heart or any other part of your body, for that matter. In Gregier's case, it alerted his doctor to the fact that his heart needed immediate attention.

Steve Gregier (heart bypass patient): It saved my life. I was sitting in the hospital thinking, "Wow, I can't believe that I'm 43 having six bypasses.

Reporter: Six bypasses. Despite cholesterol medication, exercise and watching what he ate, in his case it was hereditary.

Steve Gregier (heart bypass patient): There's a big history of heart disease in that family. I think my father died when he was 32, his brothers died, you know, somewhere around 40, so at 43, I'm the oldest living male on the paternal side of my family.

Reporter: The 128-slide scanner can isolate and look at any part of the anatomy.

Doctor (male): We catch the right time when the heart is not moving. And then we take a picture.

Reporter: This CT scanner is also much cheaper than heart catheterization, and, if the results come back favorable, can avoid the need to have more invasive procedures to get the very same information.

Topic: Spine surgery

Dr. Craig Meyer (orthopedic surgeon, male): … how does your back pain feel?

Carl Nieders (spine surgery patient, male): Oh, great. I don't have any pain at all.

Reporter (female): Carl Neders has dealt with pain in his back for forty-five years. Just recently, he's gotten some relief.

Carl Nieders (spine surgery patient): You get rid of that sciatic nerve pain, which I did, and that's what was bothering me all these years. If stand too long, or, if I could walk or move I was alright, but if I stood fifteen or twenty minutes, then it'd start hurting and I'd have to go sit down.

Reporter: Dr. Craig Meyer is new to the Columbia Orthopedic Group, and he's brought a new approach to spinal surgery with him.

Dr. Craig Meyer (orthopedic surgeon): It's a new way of doing an old surgery, so it's a new technique. We're approaching the spine through the side rather than directly up front or directly behind, and that way we're avoiding a huge muscle dissection.

Reporter: The approach cuts out a lot of recovery time, and it's a minimally invasive procedure – not something you usually associate with a spinal surgery. Older back and leg pain sufferers, like Nieders, were also usually not good candidates for spinal surgery because of the large incision and lengthy recovery.

Carl Nieders (spine surgery patient): Pain in my right leg's been going on for 45 years and I just now found a doctor that said I needed surgery and thank God, because it really helps a lot.

Reporter: So at 73, Carl Nieders is finally starting off on the right foot when it comes to dealing with his pain.

Topic: Autism breakthrough

New research being developed and tested in Mid-Missouri could introduce a lot more objectivity to identifying autism.

Right now there's not a medical test for autism. A diagnosis is based on observed behavior and psychological testing.

Voice: (over eye examining screen) how the pupil image would look, so…

Reporter: Could be. A huge new piece of the autism diagnosis puzzle lies in the child's eyes.

Xiaofei Fan (biological engineer): The pupil of a child with autism seems to take longer to react to a light stimulation.

Reporter: It's just a matter of about 30 milliseconds, much quicker than you'd ever notice, but still, pupillary light response, or PLR, is looking like a very reliable tool. Right now autism is often diagnosed through observing a child play. But if this new research is put to good use, optical scans could offer doctors a new tool in diagnosing autism much earlier, perhaps even before symptoms begin. It's also less invasive and more objective. The basics of the light response testing is a child with autism's eyes react more slowly and their pupils constrict less than other kids. So far, that's just the facts, even with the educated opinions aside. And while it can't stand alone, figuring out a connection between the pupils, the brain and autism opens up all kinds of additional opportunities for treatment. The machinery that makes PLR tracking possible was developed by Gary Yao.

Gary Yao (Professor of biological engineering): Probably it would be better if you get people from all different kinds of backgrounds together so we can find a better solution. That's my take on this.

News Story #4 (Non-human Interest Frame)

Topic: Stomach surgery for weight loss

Reporter (female): Surgeons at University Hospital are among the first to take part in a clinical trial of incision-free weight loss surgery. It's called the toga procedure.

Dr. Brent Miedema (surgeon, male): Of course, there's complications with any incision you make on the body, and it's magnified in obese patients. Infection is a problem, and then you can get hernias at the site where you make these incisions. Usually it requires four or five different sites, so there's significantly pain. We think we have a procedure where we can do that endocscopically, requiring no incisions whatsoever, so we can do it safer and hopefully cheaper than surgery can be done.

Reporter (female): Surgeons pass a flexible stapler through the mouth to make a much smaller stomach pouch, about 97% smaller in fact. You've probably more commonly heard it called stomach stapling, and this is essentially the same thing. It dramatically limits the amount of food a patient can eat, and then they feel full after only a tiny meal.

Dr. Klaus Thaler (surgeon, male): … lost weight, which is similar to the laproscopic-adjustable band. The toga device actually showed similar results. […] over a year, over the first year.

Reporter: There are going to be 275 patients around the country taking part in the trial. Thirty two will be in Columbia. Study participants are at least 100 pounds overweight and haven't been successful trying to lose weight on their own.

Questionnaire

The first part will ask you about your general thoughts on health. Please indicate how much you agree or disagree with each statement.

	Strongly disagree						Strongly agree
	1	2	3	4	5	6	7
I'm generally attentive to my inner feelings about my health.							
I'm very self-conscious about my health.							
I reflect on my health a lot.							
I notice how I feel physically as I go through the day.							
I'm concerned about my health all the time.							
Good health takes active participation on my part.							
I only worry about my health when I get sick.							
I take responsibility for the state of my health.							
My health depends on how well I take care of myself.							
Living life in the best possible health is very important to me.							
Living life without disease and illness is very important to me.							

In general, would you say your health is…
- (a) Poor
- (b) Fair
- (c) Good
- (d) Very good
- (e) Excellent
- (f) Decline to respond

Compared to one year ago, how would you rate your health in general now?
- (a) much better now
- (b) somewhat better now
- (c) about the same
- (d) somewhat worse now
- (e) much worse now
- (f) decline to respond

The next set of questions asks you about your thoughts on medical science/research in general. Please indicate how you think about medical science/research on a 7-point scale from 1 (Not at all) to 7 (very much).

	Not at all					Very much	
	1	2	3	4	5	6	7
To what extent are you willing to support government funding for medical science research?							
To what extent are you willing to support private funding for medical science research?							
To what extent are you confident in medical science to develop effective cures for diseases?							
To what extent are you confident in medical science to develop effective detection/diagnosis for diseases?							
To what extent are you confident in medical science to improve public health?							
To what extent do you believe that medical science contributes to the quality of individual life?							
To what extent do you believe that medical science is important in society?							
To what extent do you believe that medical scientists/doctors care about people?							

Please click the play button in the screen below to start playing the news video. Please be attentive. After you finish watching it, please click the "Next Page" button below to answer some questions about the news story.

[Insert Video Clip]

Have you seen the news story before this study?
  Yes
  No
  Don't know/Not sure

Please answer the following questions about the news story you just watched.

	Not at all					Very much	
	1	2	3	4	5	6	7
How closely did you watch the news story?							
How much attention did you pay to the news story?							
How much did you feel that you were immersed in the news story?							
How much did you find the news story intriguing and interesting?							
How much did you find the news story relevant to you, your family, and significant others?							

Test questions (for each news story)

(CT scanner)
According to this news story, in which part of the body did the new CT scanner detect a problem in Steve Regier (the interviewed patient)?
a. Heart
b. Kidney
c. Don't remember/know

(Colonoscopy)
According to this news story, what is the advantage of the new colonoscopy described?
a. Able to observe more areas of the colon
b. Able to find a polyp and remove it at the same time
c. Don't remember/know

(Spine surgery)
According to this news story, why was the old spinal surgery not recommended for elderly patients with spinal problems?
a. A large incision and a long recovery time
b. A low success rate due to a low spinal density
c. Don't remember/know

(Knee surgery)
According to this news story, what was the cause of Cassie's damaged knee function?
a. Chemotherapy
b. Genetic mutation
c. Don't remember/know

(Autism detection)
According to this news story, how does the new diagnosis technology detect autism?
a. Children with autism respond more slowly to a light stimulus
b. Children with autism respond more quickly to a light stimulus
c. Don't remember/know

(HPV research)
According to this news story, of the more than 100 different strains of HPV found, (   ) strains turned out to cause about 70% of cervical cancer cases.
a. Two
b. Twenty
c. Don't remember/know

(Stomach surgery for weight loss)

122

According to this news story, what is the advantage of the new weight loss surgery technique?
  a. Incision-free
  b. Anesthesia-free
  c. Don't remember/know

(Migraine relief)
According to this news story, this new medical device for migraine sufferers works like…
  a. A cardiac pacemaker
  b. An artificial respirator
  c. Don't remember/know

While watching the news story, how did you feel?

	Not at all						Very much
	1	2	3	4	5	6	7
Hopeful							
Optimistic							
Encouraged							
Fearful							
Nervous							
Worried							
Upset							
Angry							
Annoyed							
Relieved							
Reassured							
Comfortable							

How would you evaluate the news story you just watched?

Overall, the news story was…

	Not at all				Very much
	1	2	3	4	5
Focusing on human aspects					
Focusing on scientific information					
Highlighting a patient's side of the event					
Highlighting an expert's side of the event					
Involving human emotions					
Emotion-appealing					

Using the 5-point scale below, in your opinion, which word better describes the news story?

Overall, the news story was…

	1	2	3	4	5	
Easy to follow Easy to understand						Difficult to follow Difficult to understand
Questionable Untrustworthy Not convincing Not credible Unlikely						Believable Trustworthy Convincing Credible Likely
Accurate Verified Biased Distorted Exaggerated Sensationalistic						Inaccurate Doubtful Unbiased Undistorted not exaggerated not sensationalistic

How many viewers do you think would understand the scientific information in the news story?
     (a) nearly all
     (b) about 75%
     (c) about 50%
     (d) about 25%
     (e) less than 25%

How likely do you think it is that viewers feel comfortable with following the scientific information in the news story?
     (a) very low
     (b) somewhat low
     (c) moderate
     (d) somewhat high
     (e) very high

How much of the scientific information in the news story do you think you understood?
     (f) nearly all
     (g) about 75%
     (h) about 50%
     (i) about 25%
     (j) less than 25%

Please indicate your opinion about the type of medical research described in the news story you just watched.

	Not at all					Very much	
	1	2	3	4	5	6	7
To what extent are you willing to support government funding for the type of medical advance/research described in the news you just watched?							

To what extent are you willing to support private funding for the type of medical advance/research described in the news you just watched?							
To what extent are you confident in the type of medical advance/research described in the news to develop effective cures or detection/diagnosis for diseases?							
To what extent are you confident in the type of medical advance/research described in the news to improve public health?							
To what extent do you believe that the type of medical advance/research described in the news contributes to the quality of individual life?							
To what extent do you believe that the type of medical advance/research described in the news is important in society?							
To what extent do you believe that medical scientists/doctors described in the news care about people?							

Please indicate how much you agree or disagree with the following statements about your experience while watching the news story.

	Strongly disagree						Strongly agree
	1	2	3	4	5	6	7
I thought that what the patient in the news experienced could happen to me too. I thought that the patient in the news was similar to me. I thought that the patient's thoughts were similar to my own.							
I experienced feelings as if the event in the news was really happening to me. I felt as though I were the patient in the news. I felt as though the event in the news was happening to me. I experienced many of the same feelings that the patient in the news expressed. I felt as if the feelings of the patient in the news were my own.							
I felt as if I were a part of the story in the news. I felt comfortable, as if the patient in the news was my friend or a family member. I felt that the patient in the news was like people I know. What is said about health in the news often relates to me and my significant others too.							

	1	2	3	4	5	6	7
I understand what the patient in the news was feeling.							
I understand what was bothering the patient in the news.							
I tried to understand the event as it was described.							
I tried to understand the patient's thinking.							
I was able to recognize the problems that the patient in the news had.							

How much do you agree or disagree with the following statements after you watched this news story?

	Strongly disagree						Strongly agree
	1	2	3	4	5	6	7
It is important to engage in a healthy lifestyle.							
I am willing to maintain a healthy lifestyle.							
It is important to get regular checkups or recommended disease screening.							
I am willing to get regular checkups or recommended disease screening.							

Now, we'd like to ask you a few questions about you to help us classify our data.

1. How old were you on your last birthday? _____

2. What is your gender?
   a. Male
   b. Female
   c. Decline to respond

3. What best describes your race or ethnic group?
   a. Asian/Pacific Islander
   b. Black/African-American
   c. Caucasian
   d. Hispanic
   e. Native American/Alaska Native
   f. Other/Multi-Racial
   g. Decline to Respond

4. What best describes your academic standing?
   a. Undergraduate
   b. Graduate-master
   c. Graduate-doctoral
   d. Other
   e. Decline to respond

5. What is your major? (Do not use abbreviations.) _____

6. What best describes your religion?
    a. Christian-Protestant
    b. Christian-Catholic
    c. Christian-Mormon
    d. Christian-Other
    e. Jewish
    f. Buddhist
    g. Muslim
    h. Hindu
    i. Other faiths
    j. Unaffiliated/No religion
    k. Decline to respond

7. Which number describes your household's annual income? If you don't know the exact figure, please give an estimate.

    a. Less than $15,000
    b. $15,000 but less than $20,000
    c. $20,000 but less than $25,000
    d. $25,000 but less than $30,000
    e. $30,000 but less than $40,000
    f. $40,000 but less than $50,000
    g. $50,000 but less than $75,000
    h. $75,000 but less than $100,000
    i. $100,000 but less than $150,000
    j. $150,000 but less than $200,000
    k. $200,000 or more
    l. Decline to respond

8. If you have any questions or comments, please leave a note here.
    _____
    _____

APPENDIX C

Summary of the results

Measured effects	Hypotheses/Research Questions	Results		Significance test
		Non-HI frame	HI frame	
Main effects of news frames	H1: News stories about medical advances in a human interest frame will lead to greater audience involvement in the news stories than those in a non-human interest frame.	5.055 (1.037)	5.469 (.991)	Supported; $p<.001$
	H2a: News stories about medical advances in a human interest frame will lead to more favorable evaluation about the news stories than those in a non-human interest frame.	News believability 3.842 (.726) News distortion 2.415 (.730)	4.251 (.621) 2.325 (.730)	Partially supported; $p<.001$ $p>.05$
	H2b: News stories about medical advances in a human interest frame will lead to greater audience understanding of health content than those in a non-human interest frame.	3.639 (.717)	4.183 (.588)	Supported; $p<.001$
	H3: News stories about medical advances presented in a human interest frame will lead to more positive perceptions of the described medical advance/research than those in a non-human interest frame.	4.832 (1.217)	5.446 (1.028)	Supported; $p<.05$
	RQ1: In reporting medical advances, is there any difference between the two news frames (i.e., a human interest frame vs. a non-human interest frame) on the influence of audiences' perceptions of individual healthy behaviors?	6.085(.964)	6.112 (.910)	No; $p>.05$
	H5a: News stories about medical advances presented in a human interest frame will lead to higher levels of positive emotions than those presented in a non-human interest frame.	3.605 (1.338)	4.338 (1.239)	Supported; $p<.001$

	1.773 (.804)	1.759 (.858)	Not supported; $p>.05$

	DVs	**BC 95% CI**	**Mediation**
Indirect effects of news frames	H5b: News stories about medical advances presented in a human interest frame will lead to lower levels of negative emotions than those presented in a non-human interest frame.		
	H4: The level of audience involvement in the news story will mediate the influence of news frames on their news evaluation, perceived understandability of news stories, and perceptions of medical advances/research and individual healthy behaviors.		
	news believability	(.0416, .1780)	Yes
	news distortion,	(-.1108, -0238)	Yes
	understandability	(.0519, .1926)	Yes
	perception 1	(.0426, .1912)	Yes
	perception 2	(.0579, .2541)	Yes
	RQ2: If any, how does the emotion experienced by audiences mediate the influence of news frames on news evaluation, perceived understandability of news stories, perceptions of described medical advance/research, and individual healthy behaviors?		
	news believability	(.0782, .2105)	Yes
	news distortion	(-.1724,-.0536)	Yes
	understandability	(.0788, .2039)	Yes
	perception 1	(.0933, .2680)	Yes
	perception 2	(.0667, .2286)	Yes

	Identification dimensions	**BC 95% CI**	**Mediation**
Mediation by audience identification	H6a: The level of audience identification with an exemplar in a news story will mediate the influence of audience involvement on the news evaluation.	[For news believability]	
	Similarity	(-.0038, .0474)	No
	Sympathy	(.0111, .0943)	Yes
	Empathy	(-.0971, -.0102)	Yes
	Parasocial	(.0094, .1002)	Yes
		[For news distortion]	
	Similarity	(-.0767, .0106)	No
	Sympathy	(-.0584, .0466)	No
	Empathy	(.0094, .1379)	Yes
	Parasocial	(-.1520,-.0176)	Yes

Hypothesis		CI	Supported
H6b: The level of audience identification with an exemplar in a news story will mediate the influence of audience involvement on the perceived understandability of health information.	Similarity	(-.0160, .0445)	No
	Sympathy	(-.0084, .0756)	No
	Empathy	(-.0591, .0030)	No
	Parasocial	(-.0132, .0757)	No
H6c: The level of audience identification with an exemplar in a news story will mediate the influence of audience involvement on the perceptions of medical advances/research described in the news story.	Similarity	(-.0216, .0616)	No
	Sympathy	(.0459, .1942)	Yes
	Empathy	(-.0656, .0242)	No
	Parasocial	(-.0562, .0719)	No
H6d: The level of audience identification with an exemplar in a news story will mediate the influence of audience involvement on the perceptions of individual healthy behaviors.	Similarity	(-.0502, .0179)	No
	Sympathy	(.0320, .1480)	Yes
	Empathy	(-.0875, .0067)	No
	Parasocial	(-.0163, .1000)	No
H6e: The level of audience identification with an exemplar in a news story will mediate the influence of audience involvement on the intensity of emotional reactions.	Similarity	(-.0611, .0267)	No
	Sympathy	(.0125, .1862)	Yes
	Empathy	(-.0150, .1092)	No
	Parasocial	(-.0629, .0855)	No

		Group differences	Significance test
Main effects of HC	RQ3a: Is there a main effect of health consciousness on audience involvement in the news, news evaluation, perceived understandability of health information, and perceptions of described medical advances/research and individual healthy behaviors and emotional reactions?	[For audience involvement] Low (*Mean*=4.917, *SD*=.663) < Medium (*Mean*=5.196, *SD*=.978) < High (*Mean*=5.625, *SD*=.845)	*p*<.01
		[For perception of healthy behaviors] Low (*Mean*=5.765, *SD*=.944) < Medium (*Mean*=6.000, *SD*=.979) < High (*Mean*=6.531, *SD*=.569)	*p*<.01
		[For other DVs]	*p*>.05

		Group differences	Moderated mediation
Interaction effects between news frames and HC	RQ3b: If at all, how does one's health consciousness interact with news frames in the effects on audience involvement in the news, news evaluation, perceived understandability of health information, and perceptions of described medical advances/research and individual healthy behaviors and emotional reactions?	[For negative emotion] Low HC group: HI > NHI *vs.* High HC group: NHI > HI [For other DVs]	*p*<.01 *p*>.05
Conditional indirect effects of news frames moderated by HC	RQ3c: If at all, how does one's health consciousness moderate the indirect effects of news frames mediated by audience involvement in the news story?	[For perception of medical advances/research described in the news] Low HC (*indirect effect*=.1594, *SE*=.0543, *p*<.01) > medium HC (*indirect effect*=.1089, *SE*=.0365, *p*<.01) > High HC (*indirect effect*=.0585, *SE*=.0526, *p*>.05). [For other DVs]	Yes No
	RQ3d: If at all, how does one's health consciousness moderate the indirect effects of news frames mediated by audiences' emotional reactions to the news story?	[For perception of medical advances/research described in the news] Low HC (*Indirect effect*=.0782, *SE*=.0412, *p*>.05) < Medium HC (*Indirect effect*=.1609, *SE*=.0404, *p*<.001) < High HC (*Indirect effect*=.2436, *SE*=.0668, *p*<.001) [For other DVs]	Yes No

Note. HC=health consciousness; HI=human interest; Perception1= perceptions of portrayed medical advances/research; Perception2=perceptions of individual healthy behaviors; Parasocial=Parasocial interaction

VITA

Hye Hyun Hong was born in June 1980 and was raised and educated in South Korea until she came to the United States for graduate studies in 2005. Based on her educational background in Chemical Engineering at a prestigious Science and Technology research university in South Korea, she has been fascinated by science/medical journalism and other media phenomena pertinent to science, technology, and medicine. Her previous and current research has focused on media effects on public perceptions of scientific and medical/health issues and media portrayals of science/scientists and health/medical doctors. She has also delved into how governments and other organizations manage science- and health-related crises from the public relations perspective. In addition to being a respected scholar, she hopes to be a true mentor for her future students and contribute to better science/health communication in society.