

The Pennsylvania State University

The Graduate School

College of Communications

**THE ROLE OF NARRATIVES, FRAMES AND VISUALS IN HEALTH BEHAVIOR
PROMOTION: INCREASING PUBLIC AWARENESS IN THE ERA OF
INFORMATION OVERLOAD**

A Dissertation in

Mass Communications

by

Michail Vafeiadis

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Submitted in Partial Fulfillment
of the Requirements
for the Degree of

Doctor of Philosophy

August, 2017

The dissertation of Michail Vafeiadis was reviewed and approved* by the following:

Fuyuan Shen
Professor of the College of Communications
Head of the Department of Advertising/ Public Relations,
Dissertation Adviser
Chair of Committee

Frank Dardis
Associate Professor of Communications

Marcia DiStaso
Associate Professor of Communications

Mary Beth Oliver
Distinguished Professor of Communications

Ford Risley
Professor of Communications
Associate Dean of the College of Communications

*Signatures are on file in the Graduate School.

ABSTRACT

Designing effective health campaigns that can break through the clutter is critical. In today's media saturated environment, the pervasiveness of the Internet, coupled with the increasing role of social media, is changing how people find, evaluate, and process information. Previous studies have examined the effects of narratives in health campaigns in light of their ability to implicitly affect the message recipient's cognitive and affective reactions by conveying the real life experiences of an actual person. In addition, an extensive body of research has investigated the role of framing in health communication and has suggested that different health frames (gain vs. loss) have distinct effects for different types of health behaviors (prevention, detection, and cessation). Yet, health frames have been primarily examined in the context of traditional media such as print-based or videos. Finding effective ways to deliver health information is a challenge for health communicators since people are less motivated to exert cognitive effort during information processing due to the sheer amount of available information. Thus, employing powerful visuals has become essential in order to captivate people's attention and make them more attentive to the advocated message. An important stream of research has investigated independently the role of visuals, framing, and narratives. Yet, there is paucity of research examining their combined effects in health messages.

This dissertation seeks to address this gap by examining jointly the effects of narratives, frames, and visuals in promoting health messages. An online 2 (message type: narrative vs. informational) x 2 (health frames: gained-framed vs. loss-framed) x 2 (presentation format: visual vs. non visual) between-participants factorial experiment was conducted. Message type was operationalized by presenting health information in a narrative or factual fashion. Narratives conveyed health-related information through the eyes of the story's protagonist, whereas

informational messages included generic and statistical information relevant to the featured health issue, notably, sun protection and skin cancer. Message frames were operationalized in terms of gain- or loss-framed messages. A gain-framed message emphasized the advantages of performing the advocated health behavior, whereas the loss-framed message focused on the disadvantages stemming from failing to adopt the promoted health behavior. Presentation format was operationalized by presenting textual information independently or along with images that were in concert with the information included in the message. Participants were recruited from Amazon's Mechanical Turk and were randomly assigned to one of the eight experimental conditions. After reading the health message, they were asked to answer questions about their attitudes toward the message and issue and to indicate their behavioral intentions both offline and online. In short, the findings showed that health narratives are overall more persuasive than informational messages. Participants who received information in a narrative format developed more positive attitudes about sun-protection behaviors and showed heightened behavioral intentions.

The study also revealed several intriguing patterns in regards to the role of frames when applied in the context of narrative health messages. Compared to gain-framed narratives, it was found that loss-framed narratives led to more favorable attitudes toward sun protection as well as increased behavioral and sun protection compliance intentions. Conversely, participants reading gain-framed informational messages produced more positive attitudes toward the message than those who were exposed to gain-framed narratives. The mediation analyses showed that empathic identification with the character in a health story was a significant predictor on the outcome variables. Surprisingly, the findings revealed that visuals did not affect how participants evaluated the advocated health behavior. By empirically examining the combined effects of

those three variables, the findings of this study provide useful insights for health communicators and practitioners in the fields of advertising and public relations by proposing effective ways of delivering health information. Theoretical and practical implications are also discussed.

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ACKNOWLEDGMENTS

I extend the most sincere thanks to my committee for the amazing guidance and support I received. I couldn't have asked for a better committee than you!

First of all, I would like to thank my advisor, Dr. Fuyuan Shen, for his kindness, knowledge, commitment and thoughtful feedback throughout the years. Thank you Dr. Shen for helping me grow into a better researcher by patiently sharing your expertise with me. Also, to Dr. Marcia DiStaso, thank you for your unconditional support, constant encouragement, as well as for your invaluable academic and non-academic advice. You have truly been a great mentor and friend. Dr. Mary Beth Oliver, thank you for empowering me and making me a researcher with confidence with your great data analyses classes. Your warmth, sense of humor and witty way of explaining complex concepts made those classes an unforgettable experience. Dr. Frank Dardis, thank you for your earnest feedback, sharp insights and attention to details that only strengthened this dissertation. I'm really honored to have you on my committee.

I am also thankful to Dr. Matt McAllister, Dean Marie Hardin, and Dr. Ford Risley for their support and the opportunity I was given to join a great doctoral program. I'd be remiss if I didn't thank Betsy Hall for her kindness and assistance with anything and everything.

I would also like to express my deep appreciation to Dr. Krishna Jayakar, Dr. Richard Taylor, Dr. Amit Schejter, and Dr. Ben Cramer. Thank you for a great collaboration all these years. It was a real pleasure working with you at the Institute for Information Policy.

My deepest gratitude goes to my wife and best friend, Dr. Anastasia Zarkou, for her love, patience, and believing in me. Thank you for just being in my life. I couldn't have completed this journey without you by my side.

Finally, to my father, Antonios, for his endless sacrifices throughout the years and for providing me with everything I needed to keep moving forward in my academic endeavors. Without his support, I wouldn't have been here today. To my mother, Margarita for envisioning, insisting and persuading me that by coming to the United States I'd get the best education I could ever have.

“The roots of education are bitter, but the fruit is sweet.”

Ισοκράτης – Isocrates

Athenian rhetorician (436 – 338 BC)

Chapter 1

INTRODUCTION

As the amount of information we receive increases, the main challenge for communicators working in the health industry is to launch successful campaigns to raise awareness and educate the public about pressing health issues. Developing effective health promotion messages has become even more daunting as the Internet is changing how audiences search, evaluate, process and receive the latest updates on health issues (Eckler, Worsowicz, & Rayburn, 2010). It is estimated that approximately three-quarters of Americans go online to find health-related information (Fox & Duggan, 2013), thus emphasizing the Internet's strategic role in health communication. In light of the existing wealth of available health information both online and offline, it is important for health organizations to create public health campaigns that can attract, educate and prompt audiences in engaging with the recommended health behaviors, and make them as well ambassadors for health information by sharing informative content with others. A considerable amount of research has suggested that healthy behavior choices are within an individual's control (Bandura, 1982; Niederdeppe, Bu, Borah, Kindig, & Robert, 2008). Nevertheless, the design of health messages could be challenging since individuals who become aware of the persuasive intent of a message are less likely to accept it as they might perceive it with distrust (Busselle & Bilandzic, 2013). To avoid triggering counterproductive attitudinal and affective reactions, health communicators should create health content that can increase audience knowledge and awareness as well as overcome potential socioeconomic barriers (e.g. low-income groups, minorities). What type of health messages and strategies can shape and modify public beliefs and attitudes toward health issues? What are the psychological mechanisms through which those strategies work?

This dissertation draws on several theoretical frameworks to examine the psychological effects of health narratives, framing and visuals. Although prior research has examined their influences in a variety of contexts, the use of the three strategies in a single messages has not been examined in the past. Nonetheless, past studies have documented the important implications of narratives and framed messages with mixed findings (Allen & Preiss, 1997; Kazoleas, 1993; O’Keefe & Jensen, 2007; Seo, Dillard, & Shen, 2013). An important stream of research has shown that employing narratives, that is, crafting messages that include a plot with appealing details about a person’s experiences on an issue (Greene & Brinn, 2003), can generate more favorable attitudes and higher behavioral intentions toward the advocated health information (De Wit, Das, & Vet, 2008; Dillard, Fagerlin, Dal Cin, Zikmund-Fisher, & Ubel, 2010). In a nutshell, scholars have posited that narratives are effective because it is difficult to dismiss one’s factual experiences (Green, 2006). Another possible explanation is that messages that mask their persuasive intent do not receive extensive cognitive scrutiny since they are not evaluated as threats (Dal Cin, Zanna, & Fong, 2004). In contrast, people are transported and become emotionally involved in the story because of the feeling of empathy they develop and their subsequent identification with the fictional or real characters (Shen, Ahern, & Baker, 2014). Narratives have been used by health organizations to deliver important health information. CDC, for example, included narratives in its latest smoke prevention campaign wherein patients shared personal stories to illustrate the deleterious effects of smoking. Similarly, the American Cancer Society with its “Stories of Hope,” as well as the National Cancer Institute with the “Moving Beyond Breast Cancer” campaign, included affected individuals who told their personal stories to generate awareness about specific health-related behaviors.

An extensive body of research has also demonstrated that framing the information in a health message, even when containing equivalent information, can influence differently people's attitudes and behaviors (Rothamn & Salovey, 1997; Van t'Riet, Ruiter, Werrij, & DeVries, 2008). In particular, the framing literature has suggested that health messages can highlight either the advantages for adopting a specific health behavior (gain frames) or the negative outcomes from failing to comply (loss frames). Nonetheless, a recent study found that when a visual aid (e.g. bar graph) was added to a health message, the individual effects for gain- and loss-framed information disappeared and were perceived as equivalent when promoting the two specific health behaviors (Garcia-Retamero & Cokely, 2011). In the current saturated media ecosystem, information processing has become even more challenging and thus visuals play an increasingly important role as they can reduce the cognitive overload for audiences during message evaluation (Tegarden, 1999). The superiority of visuals over verbal information is manifested by the fact that people tend to accept an argument when confronted with messages accompanied by visuals rather than text-based information (Pieters & Wedel, 2004). In addition, a substantial body of literature investigating the role of visuals in public awareness health campaigns has shown that pictures can result in greater comprehension and recall of health information (Houts, Doak C, Doak, L, & Loscalzo, 2006, Kosara & Mackinlay, 2013). Generally, it is posited that visuals can act as cues by prompting audiences to engage in a more effortful information scrutiny (Belch & Belch, 2003), and help people comprehend complex medical information during decision making (Garcia-Retamero & Cokely, 2013).

The impact of new technologies (e.g. Internet, social media, and mobiles) in our daily activities, in conjunction with today's overall crowded media environment, warrants further empirical investigation to examine what message components can break through the clutter and

trigger changes in health behaviors across large populations. Currently, one of the most alarming public health problem is skin cancer. According to the Centers for Disease Control and Prevention (CDC), skin cancer is the most common type of cancer in the United States and is primarily caused from exposure to ultraviolet (UV) radiation (CDC, 2016). Only in 2016, approximately 76,380 new cases were diagnosed. It has been also estimated that implementing successful skin cancer public awareness programs could prevent about 230,000 melanoma skin cancer cases and \$2.7 billion dollars could be saved in treatment costs. Given that young Americans are social media aficionados (Duggan, 2015), along with the fact that melanoma is the third most common cancer type among young individuals (American Cancer Society, 2017), it is necessary to produce health content that can be understood, modify attitudes, and reach a wider audience. Research has demonstrated that people tend to obtain sun protection information primarily from family and friends (Nahar et al, 2013). In view of the fact that people are more inclined to share information with close acquaintances such as their friends, family, and peers, health communicators should craft messages that individuals would share with their contacts. Thus, the need to design and execute health campaigns that can stand out in an overcrowded media environment inevitably raises the following questions: What type of health messages can: a) educate the public, b) increase its behavioral intentions toward the promoted position, c) and make them public health advocates by sharing health information with others? In doing so, this study tested different types of health messages advocating sun protection with the aim to reduce one's risk of developing skin cancer.

As suggested earlier, this study will examine the combined effects of narratives, framing and visuals. Theoretically, although these concepts have been extensively studied in health campaigns, little is known about their joint effects when applied in the context of health

communication. On a practical level, this dissertation will provide insights to communication professionals on how to produce effective health information that can enhance the reach and effectiveness of the recommended health behaviors.

In the next sections, I first review the literature by reviewing the literature on narratives, framing and visual communication. Based on the literature review, hypotheses and research questions are proposed. The next chapter reports the methods and results, followed by a discussion of the study's findings. Finally, theoretical and practical implications, limitations and future research are discussed.

Chapter 2

LITERATURE REVIEW

Narratives and Narrative Communication

Narratives have been traditionally used as communication tools to change beliefs and attitudes or to simply disseminate information. Rooted in the psychological literature is the notion that humans constantly try to explain and understand their surrounding social environment. In so doing, they often rely on narratives to deconstruct complex issues by vicariously experiencing the feelings of others in an effort to make sense of similar situations they encounter. But what are narratives? What are the psychological mechanisms through which they function? And, in what context have they been studied?

In short, narratives are stories that individuals tell (Shen, Sheer, & Li, 2015). They can be conceptualized as an episodic account of a character's life experiences about an event or situation. Narratives have been often used in entertainment education (i.e. radio, television) to raise awareness and promote healthy behaviors and prosocial messages (Moyer-Gusé, 2008). Researchers have posited that narratives can be more effective in changing attitudes and behaviors than traditional advocacy messages (Dal Cin et al., 2004; Green, 2006). To date, the persuasion literature has predominantly tried to understand how individuals understand information campaigns via the lens of dual processing models such as the elaboration likelihood model (ELM) (Petty & Cacioppo, 1986) and the heuristic-systematic model (HSM) (Chaiken, 1980). More specifically, these two models have argued that persuasion is contingent on the cognitive capacities and motivation of people, and which mainly occurs through a central/systematic route or a peripheral/heuristic route (Hinyard & Kreuter, 2007). In the central route, a person engages in a careful and thorough scrutiny of message arguments and attitudinal

modification is a byproduct of the positive reactions they elicit. Conversely, the peripheral route is activated when one is unwilling or unable to examine the merits of an argument and instead relies on superficial heuristic cues (i.e. source attractiveness or credibility) to draw inferences.

A possible explanation for the effectiveness of narratives hinges on the schematic manner through which information is stored in our brains (Schank & Abelson, 1995). Particularly, it is assumed that we link all incoming information to existing stories in our mind when confronted with unfamiliar situations. The fact that stories are temporally, thematically, and spatially intertwined facilitates their future retrieval from memory. For example, the vividness of a particular character or plausibility of a situation may help us to later recover the whole story because of its causal coherence. Conversely, recollecting a particular argument will not necessarily result in the retrieval of other arguments as well (Green, 2006). Unlike dual-process models of persuasion, narratives can produce enduring attitudes as their effects persist or can augment with the passage of time (Appel & Richter, 2007).

Narratives have received extensive scholarly attention in various fields such as advertising, marketing, news, and health communication. In a study examining narratives versus a factual ad copy, also known as a list of arguments, researchers found that narrative ads heightened message involvement and produced favorable product evaluation (Polyorat, Alden, & Kim, 2007). It is also believed that narratives are more effective than factual ads because of their ability to convey the character's experiences with the advertised product and thus illustrate the psychological effects in connection with product use (Boller, 1990). Similarly, Mattila (2000) found that story-based than factual ads produced higher purchase intentions for experiential goods and evoked affective responses for consumers unfamiliar with the advertised product. In marketing, Escalas (2004, 2007) found that narratives transported consumers into the ad,

increased purchase intentions, and led to positive attitudes and meaningful connections with brands. Narratives have also been investigated in the context of news framing about polarizing social issues. A study examining perceptions and attitudes after reading an environmental news story indicated that individuals who viewed the narrative version developed negative attitudes toward shale gas drilling (Shen et al., 2014).

The extent of risk appraisal is intertwined with people's intentions to engage in risk-reducing behaviors. Because of the ongoing information overload, the main challenge for health communicators is to create campaigns capable of enhancing people's perceptions of personal risk and efficacy. According to the affective forecasting theory (Wilson & Gilbert, 2003), some individuals rely on the use of their feelings as appraisal mechanisms and determine future behaviors based on the valence of the evoked feelings. A study by Dillard and colleagues (2010) on colorectal cancer screening reported that people overestimated the barriers associated with screening because of their feelings toward this specific process. In this view, the importance of narratives in health communication is rising and health organizations often use them to distribute tips about diseases. In the realm of health communication, Hinyard and Kreuter (2007) conceptualized narratives as "any cohesive and coherent story with an identifiable beginning, middle, and end that provides information about scene, characters, and conflict; raises unanswered questions or unresolved conflict; and provides resolution" (p.778).

An extensive body of research has investigated the burgeoning role of narratives in health communication. A recent meta-analysis detected four moderating factors of narratives in relation to health messages: delivery modality (e.g. text, audio, video), type of health behavior (e.g. cessation, prevention, detection), methodological design (e.g. experimental or field study), and research design (e.g. student vs. adult participants) (Shen et al., 2015). In brevity, detection

behaviors are consisted of patient screenings to determine one's medical needs, whereas prevention behaviors focus on the measures and strategies that can be employed to avoid adverse health consequences (Rothman & Salovey, 1997). Finally, cessation behaviors involve discontinuing addictive habits such as alcohol consumption and smoking. Interestingly, the researchers found that narratives delivered through audio/video were more influential than those conveyed in print (Shen et al., 2015). The findings of the meta-analysis also revealed that narratives were equally effective for promoting either detection or prevention behaviors, whereas their effects were inconsequential for cessation behaviors.

As stated above, a factor that moderates the effectiveness of health narratives is the medium used to deliver health information (Shen et al., 2015). Up to now, narratives in health campaigns have been communicated via audio, video, print (Braverman, 2008; Green, 2006; Hinyard & Kreuter, 2007), as well as orally (Erwin, Spatz, Stotts, & Hollenberg, 1999). An experimental study employing nonstudent participants investigated the role of different modalities in delivering health messages (Braverman, 2008). The findings of this study indicated that narratives were more effective when distributed via an audio than a written format, whereas the reverse was true for informational messages. In a field experiment, Kreuter et al. (2008) used video clips with stories from African American breast cancer survivors to increase mammography screening for African American women in communities with high-rate late state breast cancer diagnosis. The researchers found that stories were more persuasive when message recipients perceived themselves as similar to the survivor and identified with her. Others inspected print-based narratives versus statistical evidence in communicating perceived risks associated with the hepatitis B virus (HBV) among homosexual men (De Wit et al., 2008). Specifically, a group of participants who self-identified as homosexuals read a narrative wherein

a member of the target group (homosexuals) described how he got infected with HBV. The findings of this study found increased feelings of personal risk and intentions to vaccinate against HBV for participants receiving evidence in a narrative format.

Narratives versus Informational Messages

One of the major challenges health communicators face is designing health campaigns that can be understood by people from diverse backgrounds (Hawley et al., 2008; Peters et al., 2009). Comparing narratives and informational types of evidence has received extensive scholarly investigation, but the literature has been inconclusive in terms of their respective effectiveness (Allen & Preiss, 1997, Zillmann, 1999). Briefly, McCroskey (1969) defined evidence as “factual statements originating from a source other than the speaker, objects not created by the speaker, and opinions of persons other than the speaker that are offered in support of the speaker’s claims” (p. 171). Generally, informational messages convey statistical evidence that relies on the presentation of summarized quantitative evidence representing a multitude of cases (e.g. total number of skin cancer cases diagnosed in the US every year), and which thereby renders more objective the disseminated information. A possible explanation undergirding the effectiveness of statistical or informational messages hinges on the *consensus heuristic*, that is, the aggregated valence of people’s reactions which can affect how one perceives a message (Axsom, Yates, & Chaiken, 1987). Statistical information can be presented in various formats such as in a graphical (e.g. bar/pie charts/ maps) or numeric (e.g. 10% chance of contracting a disease) (Lipkus, 2007; Niederdeppe, Roh, & Dreisbach, 2015) format. On the contrary, narratives, or case studies, impart information by providing personal or anecdotal evidence about an issue and which can lead to generalizations (Han & Fink, 2012; Shen et al., 2015).

The use of scientific evidence in the form of statistics is commonplace in communicating health messages because it allows people to assess their health status based on what is perceived as “standard” (Adelsward & Sachs, 1996). For example, a study about organ donation reported that statistical evidence enhanced cognitive reactions, helped recipients to make causal connections, and triggered both systematic and heuristic information processing, whereas narratives elicited more affective reactions and messages were evaluated heuristically (Kopfman, Smith, Yun, & Hodges, 1998). In a study investigating different message strategies to advance preventive behaviors toward skin cancer, Greene and Brinn (2003) reported that statistical evidence produced higher levels of susceptibility to skin cancer when using tanning beds, compared with evidence presented in a narrative format. Yet, narrative and statistical messages were equally effective in decreasing tanning intentions. Likewise, in a meta-analysis examining the persuasive effects of messages relying on either narratives or statistical information, Allen and Preiss (1997) found that statistical evidence is more powerful than evidence presented through narratives. Similar results were reported by Baesler and Burgoon (1994) demonstrating that statistical information is not only more convincing than narratives, but can result in greater audience recall after either a 2-day or an one-week period. To the contrary, a more recent meta-analysis investigating the impact of narrative messages in the context of health communication reported that narratives were more persuasive than informational messages as they were more likely to trigger changes in attitudes, intentions, and behaviors (Shen et al., 2015). A study with adult diabetics comparing narrative and information messages in the promotion of healthy behaviors such as physical exercise and proper diet provided further evidence that narratives are potentially more effective in health communication than informational messages (Gardner & Leshner, 2016). Particularly, it was found that, overall, health information relayed through

narratives was perceived as less threatening, elicited lower cognitive (e.g. counterarguing) and affective (e.g. anger) reactions, and resulted in more favorable attitudes toward the message as well as higher ratings of future compliance behaviors. On the other hand, research has found that the level of one's involvement with an issue can moderate message effects (Slater & Rouner, 1996). More specifically, Slater and Rouner (1996) reported that college students perceived more favorably statistical evidence when the message was congruent with one's values toward alcohol consumption, whereas narrative evidence was more effective when the advocated health behavior was incongruent with their beliefs. Finally, an experiment about the use of safety belts found no significant differences in attitude change when participants were exposed to either narrative or statistical information; however, it was reported that narratives had longer-lasting effects (Kazoleas, 1993).

Although employing statistics is the prevalent form for disseminating health information, there is skepticism regarding its effectiveness as audiences may find difficult to comprehend it. Studies have suggested that even well-educated patients can encounter difficulties understanding quantitative information (Lipkus, Samsa, & Rimer, 2001; Schwartz, Woloshin, Black, & Welch, 1997). In a comparison of visual versus textual types of statistical evidence, Parrott and colleagues (2005) demonstrated that the presentation format influenced the audience's understanding of health information. Specifically, it was found that verbal statistical information led to a better comprehension of multivariate relationships compared with visual statistical information. It should be noted that this study examined only one type of statistical evidence (bar graphs). It has been also suggested that people sometimes encounter difficulties in comprehending health information because they are either unfamiliar with the health issue or is hard to understand complex medical concepts (Ley, 1982). This is accentuated when it involves

people with low literacy skills, low income, or are from minority groups (Gazmararian et al., 1999). Another explanation is that people tend to focus on the numerator of a ratio and pay less attention to the denominator; a phenomenon also known as the *denominator neglect* (Reyna & Brainerd, 2008; Reyna, Nelson, Han, & Dieckman, 2009). Given the conflicting findings in the literature, it is necessary to further investigate what type of evidence is more effective in the promotion of preventive health behaviors. Hence, the following hypothesis is proposed:

H1: A narrative health message, compared to an informational health message, will lead to higher levels of: *message attitude* (H1a), *issue attitude* (H1b), *attitudes toward sun protection* (H1c), *behavioral intentions* (H1d), and *sun protection compliance* (H1e).

To date, the literature has identified several psychological mechanisms through which narratives work and make people receptive to information such as transportation, identification, and emotions/empathy.

Transportation. Researchers in narrative persuasion have highlighted the role of transportation in inducing attitude change because of its capacity to reduce counterarguing (Green & Brock, 2000; Slater & Rouner, 2002). Specifically, transportation enhances the perceived realism and vividness of story-related events and thereby triggers the development of positive attitudes and feelings toward sympathetic characters. In a nutshell, transportation can be defined as the intense immersion of individuals into a storyline that results in their temporarily physical and psychological disconnection from the real world. Green and Brock (2000) conceptualized transportation “as a convergent process, where all mental systems and capacities become focused on events occurring in the narrative” (p.701). A person’s cognitive absorption in combination with the plausibility of the storyline results in identification with the main character

and therefore increases the likelihood of accepting a message's recommended position. Contrary to the cognitively-driven theoretical premises of dual-process persuasion models, transported individuals do not engage in a taxing evaluation of arguments. Instead, they tend to produce affective reactions because of their identification or likeness of the character (Heath, Bell, & Sternberg, 2001; Oatley, 1999). Another reason is that people are less inclined to argue against implicit conclusions that communicate the character's experiences. Hence, information processing in narrative messages focuses on story elements such as events, location, and characters rather than explicit arguments that may elicit rigorous message inspection (Zwaan, Langston, & Graesser, 1995).

To measure transportation, Green and Brock (2000) developed a transportation scale with items assessing an individual's cognitive, affective, and imagery involvement. A study found that transported individuals after reading a detailed story about a murder at a mall were more inclined to hold views about heightened levels of violence in the United States and displayed less tolerant feelings pertinent to the degree of freedom psychiatric patients should enjoy (Green & Brock, 2005). In a study investigating chronic individual differences about tolerance for homosexuals, it was suggested that transported individuals in narratives changed their beliefs and attitudes by producing emotional rather than logical responses (Mazzocco, Green, Sasota, & Jones, 2010). Thus, it is hypothesized that:

H2: Transportation into the story will mediate the effects of narratives on persuasive outcomes as measured by *message attitude* (H2a), *issue attitude* (H2b), *attitudes toward sun protection* (H2c), *behavioral intentions* (H2d), and *sun protection compliance* (H2e).

Identification. Narratives can generate long-term persuasion effects in comparison to factual information because of the temporal persistence and psychological intensity of the images

they employ or mentally evoke (Green & Brock, 2005). Consequently, the characters in a story play a salient role because the degree of the audience's identification with them will determine message persuasiveness. Cho et al. (2014) construed identification as "the bond, connection, or relatedness that the audience perceives with the character of a narrative" (p.833). Identification can trigger both a cognitive and affective process wherein transported individuals become more sympathetic to characters, whom may even come to perceive as friends (Green & Brock, 2000). Yet, identification should not be understood as mere liking of a character, but, instead, as likeness or perceived similarity with them (Dal Cin et al., 2004; Oatley, 2002; Slater, 2002). Research has suggested that underlying similarities between a character and audiences can lead to higher transportation (Green, 2004) and more positive evaluations of specific behaviors. Broadly speaking, identification is associated with vicarious learning wherein characters serve as role models for future behaviors. According to the social cognitive theory (SCT), people naturally tend to monitor the behaviors of others in an effort to emulate successful behaviors while avoiding failures and/or punishment (Bandura, 1977). Vicarious learning is particularly relevant in health narratives since identification and behavior modeling are often employed to enhance the self-efficacy and confidence of people and encourage the adoption of the recommended behavior. Based on this line of reasoning, the following hypothesis is proposed:

H3: Identification with the main character in the story will mediate the effects of narratives on persuasive outcomes as measured by *message attitude* (H3a), *issue attitude* (H3b), *attitudes toward sun protection* (H3c), *behavioral intentions* (H3d), and *sun protection compliance* (H3e).

Emotions & Empathy. Research in health communication has emphasized the pivotal role of emotions in motivating behavior change (Volkman & Parrott, 2012; Witte & Allen, 2000), with a particular focus on fear appeals (Dillard, 1994, Witte & Allen, 2000). As stated above, the narratives literature has theorized that the detailed description of events and situations through the lens of an affected character inhibits counterarguing as it is difficult to dismiss the real or fictional experiences of characters. This stems from the fact that audiences witness a character's susceptibility and perceived vulnerability to the situation and as a result experience equivalent feelings (Green, 2006). But why does this occur? And under what circumstances? Generally, researchers have emphasized the influence of empathy in triggering attitude change (Heath et al., 2001; Mazzocco, Green, Sasota, & Jones, 2010; Oatley, 1999; Shen; 2011; Shen et al., 2014). According to Campbell and Babrow (2004), empathy is the "sharing of the subjective experience of another person...based on a deep sense of connection with that person's situation" (p. 160). It has been suggested that empathic reactions emanate from an individual's identification and profound understanding of the thoughts and emotions experienced by a character (Campbell & Babrow, 2004). Research by Moyer-Gusé and Nabi (2010), for example, found that participants who viewed a narrative television program with graphic details regarding the problems involved in unplanned teen pregnancy generated feelings of perceived vulnerability because of the emotional attachment they developed with the characters in the story (Moyer-Gusé & Nabi, 2010). In a similar fashion, Shen et al. (2014) found that one's proclivity to counterargue is reduced because of the identification and empathic feelings individuals developed toward the character. In particular, the researchers indicated that individuals who read a narrative news story about shale gas drilling experienced empathy toward the story protagonist

and ultimately formed negative attitudes germane to drilling. In light of the foregoing discussion, the following hypothesis is advanced:

H4: Empathy toward the main character will mediate the effects of narratives on persuasive outcomes as measured by *message attitude* (H4a), *issue attitude* (H4b), *attitudes toward sun protection* (H4c), *behavioral intentions* (H4d), and *sun protection compliance* (H4e).

Cognitive responses. Narratives differ from rhetorical arguments in terms of how information is structurally organized and conveyed. In narratives, arguments are implied and introduced in the form of stories told by protagonists and which display a causal and temporal connection (Escalas, 2004). On the contrary, persuasive messages focus on disseminating plain, logical and coherent arguments with the explicit goal to educate individuals about the promoted position and subsequently shape their opinions. The literature has suggested that if a message conceals its persuasive appeal, or is not evaluated as persuasive, people's resistance is lowered. Briefly, resistance is defined as a reaction against change and occurs when individuals become cognizant of the persuasive intent of a message. However, narratives can urge audiences to refrain from engaging in a biased information processing that occurs when confronted with counter-attitudinal messages (Petty & Cacioppo, 1986). Specifically, it is speculated that when people are exposed to belief - incongruent information they tend to counterargue, discount the message, or refute and question the motives of the source (Dal Cin et al., 2004). Yet, it is hypothesized that when one is absorbed into a narrative, he or she may become less cognitively attentive to the raised arguments and thereby the message is not perceived as a threat. Narratives can overcome resistance because it is less likely to dismiss the life experiences of others, irrespective of whether they involve actual or imaginary characters (Green, 2004; Green &

Brock, 2000; Slater, 2002; Strange & Leung, 1999). Experimental evidence suggests that transported individuals are more likely to report favorable cognitive responses when reading narratives stories than information ones (Green & Brock, 2000). Further evidence was provided by Dunlop and colleagues (2010), who in a series of experiments about different health-promotion campaigns (smoking cessation and skin cancer) showed that transported participants developed story-related beliefs. More recently, Shen et al. (2014) found that people produced positive cognitive responses after reading a narrative environmental news story, yet, transportation did not mediate the relationship between the news delivery format and behavioral intentions. Therefore, the following hypothesis is proposed:

H5: A narrative health message, compared to an informational health message, will result in less negative cognitive responses toward the advocated message and consequently to more positive cognitive responses toward: *message attitude* (H5a), *issue attitude* (H5b), *attitudes toward sun protection* (H5c), *behavioral intentions* (H5d), and *sun protection compliance* (H5e).

Framing in Health Communication

Framing is a popular communication strategy frequently employed in various disciplines with the goal to influence human judgment and decision making. In a nutshell, framing refers to the presentation of distinct but equivalent choices to people but which influence behaviors and attitudes based on whether they highlight positive or negative situational outcomes (Tversky & Kahneman, 1981). The origins of message framing can be traced to the prospect theory by Kahneman & Tversky (1979) who found that framing a choice either positively or negatively triggers different cognitive evaluations in situations involving risk or uncertainty. To explain the

mechanisms and effects stemming from the theory's distinct operationalizations, Levin et al. (1998) identified three categories related to framing: risk choice, attribute or goal framing. Risky choice framing refers to the original conceptualization by Tversky and Kahneman (1981) who argued that the depth of information processing depends on the degree of the risk involved. In particular, they suggested that people prefer certain outcomes to riskier options when receiving a gain-framed message, whereas uncertain behaviors to certain ones are favored when the message includes loss information. With regard to attribute framing, a specific feature of an object or situation is described in either positive or negative terms (e.g. 90% survival rate following a surgery vs. 10% mortality rate). Lastly, in goal framing the message emphasizes either the positive consequences of performing a particular behavior or the negative consequences from failing to comply.

Health campaigns are important in that they can influence people's attitudes and behaviors to adopt specific behaviors. An important stream of research has demonstrated that framing is a successful tool in promoting healthy behaviors (Rothman & Salovey, 1997). In particular, past research has shown that differently framed health messages can produce distinct persuasive outcomes, even when they convey similar information (Rothman & Salovey, 1997; Van t' Riet et al., 2008). Persuasive health messages have been operationalized in terms of emphasizing the advantages of performing a healthy behavior (gain frame), or highlighting the undesirable consequences from not performing the advocated behavior (loss frame). The extant literature in health frames reveals an extensive application of the theory in diverse contexts. Methodologically, health frames have been primarily examined by conducting either lab experiments (Bartels, Kelly, & Rothman, 2010) but also in the field (Rivers, Salovey, D. A. Pizarro, J. Pizarro, & Schneider, 2005). Different sample populations have been used to study

health frames including women only (Gallagher, Updegraff, Rothman, & Sims, 2011), mixed-gender population (Van 't Riet et al., 2008), or students-only (Werrij, Ruiter, Van 't Riet, & de Vries, 2010). Although the preferred delivery modality has been predominantly print-based ads/pamphlets (i.e. Gerend, & Shepherd, 2007), scant attention has been paid on the effects of framed health messages when distributed in the form of visual images or videos (Schneider et al., 2001; Seo et al., 2013).

Besides one's cognitive evaluation of the framed information, it is believed that the context wherein such recommendations are communicated affects how people construe certain health behaviors. Rothman and Salovey (1997) proposed that the effectiveness of framed health messages depends on the degree of risk associated with adopting the recommended behavior. They suggested that detection behaviors (e.g. mammograms, clinical skin examination) are perceived as more risky due to the looming fear to be diagnosed with a disease. In contrast, prevention behaviors (e.g. sunscreen use, physical exercise) are evaluated as safe because performing those behaviors can reduce the likelihood of getting an illness (Rivers et al., 2005). In short, it could be argued that the type of the advocated behavior (detection versus prevention) can moderate the effects of framed information. Gain-framed messages are more effective when promoting prevention behaviors because people tend to be risk-averse when confronting low risk situations. Messages focusing on losses, however, are speculated to be more persuasive in detection behaviors because people tend to take risks in situations involving great risk and uncertainty. It is thus hypothesized that health information focusing on losses captures people's attention and induces compliance because of the anxiety and fear it evokes (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001; Meijnders, Midden, & Wilke, 2001; Slater, Karan, Rouner, & Walters, 2002). Another reason pertains to the concept of *negativity bias*, that is,

negative information has a greater impact on information processing than similar positive information. Scholars have pointed out that because negative information violates people's expectations it thus triggers more scrutiny and systematic processing (Buda & Zhang, 2000; Levin, Schneider, & Gaeth, 1998; Smith & Petty, 1996). Given that people are frequently exposed to information that has been framed in various ways, it is suggested that loss-framed information is *cognitively stickier* than its gain-framed counterpart and can impact people's judgments. In a series of studies, Ledgerwood and Boydstun (2013) demonstrated that loss-framed messages have lingering effects over time as it is more difficult more individuals to cognitively re-process loss-framed information into a gained-framed information than the opposite.

Experimental research investigating message framing in health campaigns has documented that gain-framed appeals are more effective in prevention health campaigns (Detweiler, Bedell, Salovey, Pronin, & Rothman, 1999; Rothman & Salovey, 1997; Wilson, Purdon, & Wallston, 1988), whereas loss-framed ones are more convincing in detection behaviors (Meyrowitz & Chaiken, 1987). For example, Meyrowitz and Chaiken (1987) demonstrated that participants developed more favorable attitudes, intentions, and behaviors toward breast self-examination behavior (BSE) when they viewed messages emphasizing the negative consequences of noncompliance than when receiving equal information but in a positive fashion. The researchers found no differences between gain- and loss-framed information in terms of information message recall. Likewise, in a study examining health-framed messages, a group of researchers reported that loss information led to more favorable attitudes about BSE behaviors (Williams, Clarke & Borland, 2001). Research has indicated that the effects of gain- and loss-framed messages are moderated by the temporal proximity of the described health-

related consequences. A study reported that loss-framed messages were more effective than gain-framed ones only when participants were exposed to the short-term consequences of alcohol consumption (Gerend & Cullen, 2008). In contrast, no differences were detected between framed information when long-term consequences were emphasized.

Conversely, Detweiler et al. (1999) demonstrated that gain-framed messages increased the behavioral intentions for both male and female participants about using sunscreen in comparison to loss-framed messages. In line with the postulation that gain-framed messages are more influential in promoting prevention behaviors, Jones and colleagues (2003) found more favorable intentions and behaviors toward exercise only when participants received positively framed messages. In another study, Rothman et al. (1993) also demonstrated that positively framed messages can promote prevention-related behaviors. Specifically, the researchers reported that women who read gain-framed messages about the relationship between sun tanning and developing skin cancer were more willing to request sunscreen and additional information in regards to skin cancer prevention. More recently, Gray and Harrington (2011) found further evidence supporting the notion that positive information is more effective over negative for preventive behaviors. The researchers studied framing effects via the lens of the exemplification theory and found that positive frames were more influential than negative frames as they produced positive beliefs about perceived behavioral control and intention to exercise. In a meta-analysis examining the persuasive effects of gain- and loss-framed messages in detection behaviors, O’Keefe and Jensen (2007) found an advantage for positive information. However, when the data were analyzed by health behavior type it was reported that the different effects were mainly attributed to messages related only to dental hygiene. These authors interpreted the findings in light of the positive emotive state gain-framed messages produce, whereas, as it was

argued, loss-framed messages contain negative information that may elicit reactance. On the basis of the above discussion on different delivery methods of health content and message frames, the following hypothesis is proposed:

H6: A gain-framed health message, compared to a loss-framed message, will lead to higher levels of persuasive outcomes as measured by *message attitude* (H6a), *issue attitude* (H6b), *attitudes toward sun protection* (H6c), *behavioral intentions* (H6d), and *sun protection compliance* (H6e).

Visual Images and Information Processing

The abundance of online information along with the crowded interfaces makes information processing a challenging task for audiences. In this environment, visuals have become salient and advertisers, public relations practitioners, and marketers are trying to find ways to present and distribute information that will attract and capture the audiences' attention, render it memorable, and ultimately share it online. According to ELM, pictures can operate as peripheral cues that can influence unmotivated consumers' attitudes (Petty, Unnava, & Strathman, 1991). It has been also suggested that using pictures, especially unexpected ones, can garner attention and urge people to extend more cognitive effort during information processing (Belch & Belch, 2003; Mothersbaugh, Huhmann, & Franke, 2002; Toncar & Munch, 2001). Given the power of visuals, Scott (1994) advanced the concept of visual rhetoric and proposed that visuals should not be perceived as complementary to verbal information but as independent persuasive tools that can communicate arguments and raise questions. Briefly, research in consumer behavior and advertising has undertaken a twofold empirical investigation of visual effects in relation to verbal messages. A stream of studies has primarily explored the role of

visuals on memory and indicated that pictures can lead to better recall than verbal information. One of the earliest studies demonstrated that when print advertisements included images they triggered better recall in comparison to non-visual ads (Starch, 1966). Research in consumer psychology has also highlighted the contribution of pictures in information recall. For example, Leong et al. (1996) examined the effects of visuals in consumer products and found that high-meaning pictorial ads, that is, ads whose visual component conveyed additional cues facilitating future information recall, resulted in higher brand name recall than text-only or low-meaning visual ads. More recently, Terry - McElrath and colleagues (2006) analyzed the effects of antismoking ads on youth and found that ads with personal testimonials and graphic images produced greater message recall and engagement. Another strand of research has investigated the influence of visuals in changing consumers' attitudes (Childers & Houston, 1984; Mitchell & Olson, 1981). A study by Mitchell and Olson (1981) showed that advertisements with visuals generated more favorable attitudes toward the brand and were more successful in communicating the features of the advertised product than textual-based ads. It was also demonstrated that the positive evaluation of visual ads led to attitude change and higher purchase intentions than verbal ads.

The influence of visuals has increased in the Internet era as they are frequently employed by companies and organizations to communicate information for products and services but also as diagnostic tools by consumers when weighing online information during the decision-making process. The emergence and rising popularity of visual-oriented social media platforms such as Pinterest, Instagram, and Snapchat illustrates the need for brands and organizations to engage in effective storytelling to distribute effective messages to advance their business interests and reach larger audiences. Scholarship on visuals has demonstrated their role in affecting perceptual

fluency, that is, the ease via which an individual processes information. For example, research has shown that a matching visual can heighten how favorably a neutral object is evaluated in comparison to a mismatching one (Reber, Winkielman, & Schwarz, 1998), and which can subsequently trigger a more positive affect (Winkielman & Caioppo, 2001). Another study investigated visual influence when consumers search online for product information (Lin, Lu, & Wu, 2012). In this study, participants were exposed to either a fictitious blog displaying only verbal articles or to a blog with articles containing both textual and visual product information. It was reported that consumers perceived articles with pictures as more credible and of higher quality. In addition, blogs with visual information enhanced consumers' interest toward the product as well as their purchase intentions. Lee and Gretzel (2012) found that increasing website aesthetics by incorporating pictures to verbal information generates greater mental imagery, that is, the process through which individuals visualize a specific activity in the absence of external stimuli. Compared to textual and audio information, it was also shown that pictures elicited stronger and more confident attitudes in the presence of negative information.

Mechanisms for Visual Effectiveness

Previous research has provided evidence in regards to the effectiveness of visuals for information dissemination. A popular explanation is offered by the dual-coding hypothesis, according to which there are two distinct processes associated with how information is stored in human brain (Paivio, 1971). It is posited that pictorial input is encoded as both verbal and imagery representations thereby making more possible its future retrieval from memory, whereas verbal information is recorded only in a verbal form. The *availability heuristic* also explains the primacy of visuals during information processing (Higgins, 1996). Particularly, it is proposed

that information that is readily available in memory due to its vividness or recurring activation can influence human judgments. Another possible explanation regarding the power of visuals pertains to their ability to produce affective reactions. It is believed that the use of emotional visuals can increase risk perceptions than neutral or irrelevant pictures (Zillmann, Gibson, & Sargent, 1999) and which in turn can trigger action when compared with rational messages (Zillmann, 2006). Briefly, visuals are more likely to appeal to emotions because they can focus on a specific aspect of an emotional event. In his classic study on the role of visuals in advertisement, Mitchell (1986) demonstrated that consumers use them to draw inferences about a product and the overall valence of the visual evaluation can affect attitudes toward the product and brand. More recent research has also confirmed that individuals are prone in adopting the valence of emotional-oriented messages (Holmes & Mathews, 2005). For example, when people listened to an emotional story and were then asked to either visualize or concentrate on the textual information, negative feelings were generated when encountering negative scenarios and positive feelings with positive scenarios only when they were involved in an imagery information processing.

There is empirical evidence showing that evocative visuals can modify attitudes. For example, graphic pictures portraying images of disease and death resulting from chronic smoking can heighten a viewer's affective reaction toward the message (Biener, Ji, Gilpin, & Albers, 2004). Visuals can also influence people's perceptions about the likelihood of a particular ethnic group contracting a disease. A study indicated that using a picture of a person from an ethnic group led to the belief that this group is susceptible in contracting a disease despite the accompanying textual message did not contain any information about the person's ethnicity nor it provided any risk estimates about this particular group getting the disease

(Gibson & Zillmann, 2000). A study about intangible services found that using concrete visuals had an impact on consumers' degree of elaboration as well as the quality of their consumption vision (Walters, Sparks, & Herington, 2007). Research in consumer psychology has explored different message strategies for product promotion and demonstrated that consumers evaluated more positively information distributed in a narrative format than when described in a list form (Adaval & Wyer, 1998). It was also found that narrative effects were more pronounced when pictures accompanied verbal information and resulted in higher information recall. Another stream of research investigated textual versus visual information in impression formation about politicians (Adaval, Isbell, & Wyer, 2007). Based on the findings, it was suggested that when pictures were added to narrative information individuals perceived them more informative, were more likely to construe the implications of the events in the story, and thereby increased the extremity of their judgments than when viewing a disorderly presentation of information.

Until now, studies have primarily explored the impact of visuals by focusing on the effects a single image elicits. Yet, there is limited knowledge examining how a combination of interdependent visuals can affect people's evaluation of health information. Prior studies in consumer behavior suggested that providing a plethora of images can reduce consumer uncertainties when shopping online (Then & DeLong, 1999) and urge them to develop more positive attitudes and higher behavioral intentions, especially when it features people (Jeong & Choi, 2004). Providing consumers vivid pictorial experiences can increase their involvement during online shopping (Kim, Fiore, & Lee, 2007). Research has also shown that incorporating vivid images in articles about risks to safety and health can arouse interest relevant to these risks and trigger a more attentive inspection of the articles (Zillmann, Knobloch, & Yu, 2001).

Visuals in Health Communication

A wide body of research has shown that visuals are influential during the decision making process since people are more willing to accept the advocated message when confronted with messages containing visuals than text-based information (Pieters & Wedel, 2004). A line of research has posited that the introduction of visual aids facilitates the comprehension of information when contemplating health behaviors (Goodyear-Smith et al. 2008), and can produce different behaviors according to the message's delivery format. For instance, a study by Garcia-Retamero and Cokely (2011) found that print gain-framed messages were more effective for prevention behaviors (i.e. condom use), whereas loss-framed messages produced more favorable reactions toward detection behaviors (e.g. sexually transmitted diseases –STDs- screening); findings consistent with the notion in the framing literature about the distinct effects of different behavior types. Interestingly, when a visual aid accompanied the health message, the individual effects for both gain- and loss-framed messages disappeared and were perceived as equal in the promotion of the two health behaviors.

Another group of researchers manipulated the visual and auditory components of a series of videos including gain- and loss-framed messages about cigarette smoking (Schneider et al, 2001). The results revealed that participants who viewed a gain-framed video generated more favorable attitudes about smoking cessation than those in the loss-framed condition. Furthermore, the effects of positive messages were more persistent over time than those from negative messages. Yet, these findings contradicted prior studies suggesting that participants reading a loss-framed message and who were high in self-efficacy were more willing to quit smoking (Van 't Riet et al., 2008). A more recent experiment by Seo et al. (2013) investigated the effects of visuals in a series of experiments about two health issues: sunscreen use and dental

floss. In both experiments, the researchers found that the impact of visuals was inconsequential for positive frames, whereas the inclusion of images to loss frames elicited more fear.

Surprisingly, the presence of an image mitigated the persuasiveness of loss frames, thus possibly eliciting reactance. Finally, Dobos and colleagues (2015) found that visuals unaccompanied by explanatory text were only effective for eliciting emotions and failed to communicate information relevant to the Alzheimer's disease. In an analysis of anti-smoking ads, it was demonstrated that ads with personal testimonials and repellent images instigated greater information elaboration, recall, and engagement (Terry - McElrath et al., 2005).

On the basis of theory and research discussed above, this dissertation proposes that visual narratives can be a novel useful approach in the arsenal of health communicators. Specifically, it is suggested that visual narratives will accentuate the impact of the conveyed health information and also increase one's online behavioral intentions toward the distributed content. Visual narratives are defined as the sequential use of intertwined pictures that progress in tandem with the story. Unlike previous operationalizations of visual aids (e.g. bar charts, independent photos) this dissertation argues that the combination of a series of coherent visuals along with a textual narrative can trigger more favorable attitudes toward the advocated position in comparison to informational messages accompanied by graphical visual aids. For example, a study comparing different types of video content found that emotional videos resulted in heightened long-term skin protection intentions than informational videos (Cody & Lee, 1990). As it was mentioned above, Kreuter et al. (2008) found that audiences were more engaged and more likely to recollect a story after watching videos of breast cancer survivors. Thus, it is predicted that:

H7: A visual health message, compared to textual message, will lead to higher levels of persuasive outcomes as measured by *message attitude* (H7a), *issue attitude* (H7b), *attitudes toward sun protection* (H7c), *behavioral intentions* (H7d), and *sun protection compliance* (H7e).

Although a large body of literature has individually examined narratives, visuals, and health-framed messages, little is known about their combined effects as well as the underlying mechanisms through which they operate. A clear understanding of how those three variables jointly operate is essential to break through the clutter and create successful health communication campaigns. Hence, the following research question is introduced:

RQ1: Will there be an interaction effect between message type, frames, and presentation format on a message recipient's *message attitude*, *issue attitude*, *attitudes toward sun protection*, *behavioral intentions*, and *sun protection compliance*.

Social Media and Health Messages

It is estimated that approximately 65% of American adults use social media (Perrin, 2015) and, overall, 72% of Internet users go online to find health information about an array of health topics (Fox & Duggan, 2013). The Internet provides a multitude of health-focused information sources (Fox & Fallows, 2003; Morahan-Martin, 2004), and, regardless of age (Gorham, Carter, Nowrouzi, McLean, & Guimond, 2012), people use it as a primary source for obtaining health information than visiting a healthcare professional (Fox & Rainie, 2002). Studies have shown that patients want providers to utilize social media to: allow them schedule appointments, disseminate health information, and inquire about health issues (Fisher & Clayton, 2012). The same researchers posited that the apt use of social media can enhance relationship-

building between healthcare providers and patients, a process also known as socialized eMedicine (SeM). Specifically, the quick conveyance of health information and support can lead to better health outcomes and heightened satisfaction since patients are more likely to become engaged and perceive themselves as equal partners in disease management (Fisher & Clayton, 2012). In recent years, social media has been incorporated into public health campaigns to promote positive health behavior changes, -such as smoking cessation (Pechmann, Pan, Delucchi, Lakon, & Prochaska, 2015) and dietary interventions (Chang, Chopra, Zhang, & Woolford, 2013), and expand their online reach (Chou, Hunt, Beckjord, Moser, & Hesse, 2009). Besides using them for health promotion programs, social media are also utilized by hospitals for: 1) customer service, 2) community outreach, 3) patient education, 4) public relations, and 5) crisis communication (Bennett, 2010).

People across the world currently face multiple health challenges, thus highlighting the need for embarking on awareness initiatives that promote healthy lifestyles. Social marketing, that is, the development and implementation of activities aimed at influencing people's behavior that can advance the social good, is on the rise within the health community (Grier & Bryant, 2005). In addition, social media can facilitate viral marketing, which is triggered by the instant information sharing (Thackeray, Neiger, Hanson, & McKenzie, 2008). Ultimately, health messages can reach beyond the target population as the latter tends to share online information with friends and families, a primary health information source (Wells, 2008). What distinguishes social media from traditional media is their participatory nature which allows users to indicate their emotions by commenting, liking, or sharing it, hence making them a promising tool for promoting positive behavior changes such as sun protection. The untapped potential of social

media requires the empirical investigation of what type of health information can engage online audiences. Therefore, the following research question is proposed:

RQ2: What type of health messages will result in higher social media engagement and overall intentions to share?

Chapter 3

METHOD

To study the proposed research questions and hypotheses, a 2 (Message Type: Narrative vs. Informational) x 2 (Message Health Frame: Gain vs. Loss) x 2 (Presentation Format: Visual vs. No Visual) between-subjects factorial experiment was conducted. Eight versions of health messages were constructed by varying the message type, visual format, and health frame.

Participants

A total of 433 users were recruited from Amazon's Mechanical Turk (MTurk) to participate in this experiment. Prior studies have indicated that MTurk participants are more demographically diverse than college student samples (Buhrmester, Kwang, & Gosling, 2011). To ensure the quality and relevance of the data, only users who were currently residing in the U.S. and had a prior Human Intelligence Task (HIT) (e.g. survey) approval rate of at least 90% were eligible to participate.

Participants received \$1 as compensation for their participation. Among them, 51.3% were male ($N = 222$) and 48.7% were females ($N = 211$) with a mean age of 37.10 ($SD = 12.56$). Their ages ranged from 19 to 85 years old. Of them, 79% were Caucasian ($N = 342$), 9.0% reported being African American ($N = 39$), 6.9% Asian or Asian-American ($N = 30$), 3.2% Hispanic ($N = 14$), 1.6% other ($N = 7$), and .2% Native Hawaiian or Pacific Islander ($N = 1$).

Procedure

Prior to data collection, the project was submitted to the Institutional Review Board (IRB) for review. All eight conditions of the health messages were inserted in Web surveys.

Each participant was given a URL and instructed to visit the study website on a computer of their choosing. First, participants were asked to read and electronically sign a consent form prior to participating in the experiment. Specifically, they were informed that they were participating in a research study about health messages. After providing informed consent and indicating that they were 18 years old or older, they were randomly assigned to one of the eight experimental conditions. In the first page, participants were instructed to read a story at their normal speed about a health issue. While reading the message, the “Next Button” appeared on the screen after 2 minutes before participants were able to move to the next page. Upon reading it, participants were asked to complete an online post-test questionnaire comprised of measures assessing their feelings and attitudes toward the health message and issue. At the end of the survey, demographic information such as age, race, income, and education level was collected.

Given the limitations in regards to online experiments, two attention check questions that required specific responses were embedded in the questionnaire to enhance the validity of the recorded responses. Those who failed to correctly select the specific responses were directed to the end of the survey and their responses were excluded from the analysis. Each session lasted approximately 20 minutes.

Stimuli

Eight messages discussing the topic of sun protection and skin cancer were constructed (Appendix A). The rationale for choosing this message topic is attributed to the fact that skin cancer has traditionally received the most extensive health coverage in the U.S. among any other health issue (Pew, 2008). In addition, cancer is also the most searched health topic online (Hu, 2015). Hence, it is critical to launch public awareness campaigns that will resonate with online

and offline audiences and increase their preventive health behaviors as well as their online behavioral intentions in the era of social media ubiquitousness.

Message Type

Message types were manipulated by creating either a narrative or an informational message describing the benefits from taking precautions in the sun or the negative consequences from unprotected sun exposure. Narrative messages used a fictitious person's sun-related experiences, Jennifer McNair, to educate readers about sun protection. Informational messages used an expert, notably a dermatologist, as the preferred information source to relay general sun safety facts. The length of the messages was kept consistent throughout the experimental conditions (548- 561 words).

Health Frames

Gain-framed messages. For both message types, the positive-framed condition emphasized the advantages associated with diligently engaging in sun-protection behaviors when people are exposed to sunlight for an extended period of time. In the narrative condition, the message told a story about the benefits associated with adopting protective skin cancer behaviors via the lens of an individual who was regularly exposed to sun and took all necessary precautions against sun exposure, whereas the informational report used a dermatologist to present evidence in support of the advocated position. Sentences like the following were included respectively in the gain-framed narrative and informational messages: "One of the best ways to maintain my skin healthy is by wearing sunscreen before going out," McNair said. "It is part of my daily routine: I brush my hair, brush my teeth, and then I apply my sunscreen," and "As dermatologists, we have been

saying for many years that for adequate protection everyone over the age of six months, even people with darker skin, should use sunscreen daily, all year round and in any weather,” Dr. Smith said.”

Loss-framed messages. The loss-framed conditions focused on the adverse health effects, such as developing skin cancer and premature skin aging, stemming from one’s repeated avoidance or omission to protect from ultraviolet rays. The loss-framed narrative condition used a character to relay her failure to adopt health behaviors which eventually contributed to developing skin cancer. Particularly, it contained sentences such as: “McNair didn’t practice sun protection despite the long hours she used to spend outdoors. “I was never wearing any protective clothing and left my body exposed to the sun,” she sighed. And, “I was addicted to the outdoors. Even when the sun was at its peak between 10 a.m. and 3p.m., I never sought shade.”

Conversely, the loss-framed informational message used a dermatologist who warned readers about the type of behaviors that can put you at risk as a result of prolonged unprotected exposure to the sun. More specifically, this condition included sentences like “Another factor that can put you at greater risk of developing skin cancer is not wearing protective gear in the sun such as long-sleeved shirts, long pants, sunglasses and hats. Dr. Smith said. “The less skin you cover, the more in danger you are.” And, “Not protecting yourself from the sun rays, especially during the peak hours of 10 a.m. and 3 p.m., adds up over time and can cause significant sun-damage and accelerated photoaging,” Dr. Smith said.” Finally, the introductory and concluding paragraphs included equivalent information, however, slight modifications were applied to reflect the respective framing manipulation.

Presentation Format

The presentation format was manipulated by having messages containing visuals vs. textual only information. It is important to emphasize that different image manipulations were applied to the visual and the informational conditions, respectively. Specifically, visual narratives portrayed a sequence of images that emphasized the human factor by providing snapshots at different stages from the character's life and how she was affected by the use (or non-use) of sunscreen. For instance, in the loss-framed narrative message the section discussing how the character had just underwent her fourth skin cancer surgery was accompanied by a recovery photo wherein surgical wounds were evident on the character's face after removing skin cancer. In the non-visual conditions, the message employed only verbal information to convey its arguments. In contrast, in the visual informational condition a mix of images comprised of graphs with statistical information as well as miscellaneous pictures (e.g. applying sunscreen, sunburned skin) were employed. To ensure the ecological validity of the stimuli, an analysis of recent media and health organizations' messages was conducted to adopt similar writing techniques and to incorporate relevant examples and evidence into the fictitious health messages.

Mediating Variables

This study hypothesized the presence of four variables, namely, - transportation, identification, empathy, and cognitive responses, - that will mediate the effects of the IVs on the DVs. Table 1 summarized the means and standard deviations of the mediators in the study.

Transportation. It was measured by adopting six of the scale items (Cronbach's $\alpha = .78$) developed by Appel et al. (2015). Participants were asked how cognitively involved they were

while reading the health message, about their experienced emotions, and mental imagery. Responses are on a 7-point scale from 1 (very much) to 7 (not at all). Sample items included, “I was mentally involved in the message while reading it” and “The message affected me emotionally” (1 = *strongly disagree*, 7 = *strongly agree*).

Identification. To measure the extent of *identification* with the character, participants were asked a series of questions on whether they perceived the character as similar to them. These items (Cronbach’s $\alpha = .91$) derived from previous research (Cohen, 2001). Example items included, “I was able to understand the events in the message in a manner similar to that in which the character understood them” and “During viewing, I felt I could really get inside the character’s head” (1 = *strongly disagree*, 7 = *strongly agree*).

Empathy. Participants responded to an eight 7-point Likert scale (Cronbach’s $\alpha = .93$) to assess empathy (Shen, 2010): “I experienced the same emotions as the character when viewing this message.” “I can see the character’s point of view.” “I can relate to what the character was going through in the message.” Responses varied from 0 = *not at all* and 7 = *completely*.

Cognitive responses. To measure *cognitive responses*, participants were asked to list up to 5 thoughts they had when viewing the health messages. Cognitive responses were then coded as either a) supportive or b) non-supportive. Supportive statements expressed participants’ agreement with the message, whereas non-supportive statements conveyed their disagreement with the message. A cognitive response index was created by subtracting the number of negative statements from positive statements (Mazzocco, Green, Sasota, & Jones, 2010). The questionnaire had a page comprised of five boxes and the following instructions: “Please write down up to 5 thoughts/feelings you had when reading this health message. State your thoughts

and ideas as concisely as possible. A phrase is sufficient. Ignore spelling, grammar, and punctuation.” The values in the index ranged from 0 to 10 ($M = 4.66$, $SD = 2.07$).

Measures for Dependent Variables

The outcome measures were comprised of seven variables inquiring about participants’ overall assessment of the message and health issue, future behavioral intentions, as well as their intention to discuss the advocated info with others and engage with it on social media. Table 1 reports the descriptive statistics of the dependent variables.

Following Bruner (1998), **message attitude** was measured with the help of two 7-point sets of semantic differential scales (Cronbach’s $\alpha = .92$) in terms of cognition (uninformative/informative, not clear/clear, meaningless/meaningful), liking (boring/interesting, unappealing/appealing, unattractive/attractive, dislike/like).

Issue attitude was assessed by three 7-point Likert scale items (Cronbach’s $\alpha = .94$; 1 = *strongly disagree* and 7 = *strongly agree*): “I support what the message was trying to accomplish,” “I agree with the position advocated in the message,” and “I am favorable toward the main point of the message” (Seo et al., 2013).

Attitudes toward sun protection: Participants responded to four 7-point Likert items (Cronbach’s $\alpha = .76$) to assess their attitudes toward sun protection (Cokkinides et al, 2006). Sample items included: “Spending time in the sun without protection can increase my chances of developing skin cancer” and “Using sunscreen lotion allows me to enjoy the outdoors with less worry.” Responses varied from 1 = strongly disagree to 7 = strongly agree.

The operationalization of behavioral intention was twofold: (a) behavioral intentions (b) sun protection compliance intentions.

(a) Behavioral intention measured one's willingness to comply with the advocated health behavior. Specifically, it was measured with three 7-point Likert items (Cronbach's $\alpha = .92$) to evaluate participants' willingness to follow the health recommendations included in the message: "I intend to act in ways that are compatible with the position advocated by the message," "I plan to act in ways that are consistent with the position advocated by the message," and "I am going to make an effort to do what the message asked me to do" (Seo et al., 2013).

(b) Sun Protection Compliance Intentions: Following Myrick and Oliver (2015), sun-protection behaviors were measured via three items (Cronbach's $\alpha = .68$) in which participants rated their willingness to adopt the three advocated health behaviors: "Use sunscreen before I participate in outdoor activities," "Seek shade during peak sunlight hours" "Wear protective clothing before I participate in outdoor activities."

Finally, two measures to measure social media engagement intentions and intention to share the recommended information with others were employed.

Social Media Engagement assessed a message recipient's willingness to engage with the advocated message online. Particularly, online behavioral intentions were evaluated with five items (Cronbach's $\alpha = .88$) borrowed from DiStaso et al. (2015). Participants were asked on a 5-point scale how likely they were to "Like", "Share", and "Comment" on the topic that was discussed in the news article."

Intention to Share. A one item adopted from prior research (Myrick & Oliver, 2015) was used to measure participants' intention to share the info that was contained in the health message: "How likely are you to talk to a friend or family member about this message."

Measures for Control Variables

Skin type. Participants' *skin type* was assessed according to Fitzpatrick's (1988) skin classification: (a) always burns, never tans, (b) burns easily, tans minimally, (c) burns moderately, tans gradually to light brown, (d) burns minimally, always tans well to moderately brown, (e) rarely burns, tans profusely to dark, and (f) never burns, deeply pigmented, least sensitive.

Family member diagnosed with skin cancer. One item adopted from Riles et al. (2015) was used to assess the extent to which participants were familiar with skin cancer ("Do you have any family-member or friend diagnosed with skin cancer? Yes = 113 (26.1%), No = 320 (73.9%).

Table 1: List of Variables

	Cronbach's α	M	SD	Skewness	Kurtosis
Mediating Variables					
Transportation	.78	4.99	1.02	-.35	.23
Identification	.91	4.62	1.10	-.35	.37
Empathy	.93	4.83	1.08	-.46	.40
Cognitive Responses	N/A	4.66	2.07	.03	-.13
Empathic Identification	.95	4.65	1.15	-.45	.36
Dependent Variables					
Message Attitude	.92	5.88	.94	-.93	.49
Issue Attitude	.94	6.46	.81	-1.63	1.90
Attitude towards Sun Protection	.76	6.17	.83	-.96	.30
Behavioral Intentions	.92	5.67	1.28	-1.08	1.11
Sun Protection Compliance	.68	5.65	1.13	-.89	.61
Intention to Share	N/A	4.40	1.84	-.47	-.80
Social Media Engagement	.88	3.18	1.85	.36	-1.05

Chapter 4

RESULTS

The first section of this chapter reports the results of the manipulation checks of the three independent variables that were employed in this study (message type, message health frame, presentation format). Results in the second section are presented following the order of the hypotheses and research questions. First, the effects of message types (H1) are reported, followed by mediation analyses that examined the presence of any significant indirect effects for the mediators (H2 - H5). This study employed PROCESS macro (Model 4) developed by Hayes (2013) using 5000 bootstrap samples with 95% bias-corrected confidence intervals to investigate the indirect effects proposed by the hypotheses. If the confidence intervals did not contain a zero, this was interpreted as evidence for the presence of an indirect effect. Next, the effects of message health frames on the outcome variables are presented as predicted by H6, followed by the interaction effects results between the three independent variables on the outcome measures. The findings regarding social media engagement and intention to share the information in regards to the recommended health behavior are presented at the end.

Skin type and having a family member diagnosed with skin cancer were statistically controlled throughout the analyses, unless otherwise indicated. Prior to conducting the proposed analyses, the data were examined for normality. Kline (2011) recommended that variables with skewness greater than $|3|$ and kurtosis greater than $|5|$ are problematic. To check for univariate outliers, the data were screened for values with z-scores greater than 3.29 (Tabachnick & Fidell, 2007). Mahalanobis distance was employed to assess the presence of multivariate outliers. In total, 10 outliers were detected based on the above normality criteria. A closer inspection of the data revealed that those participants were always “clicking through” on a particular option without actually paying attention to the different survey items. With the deletion of those

outliers, the total number of participants was reduced to 433. Table 1 displays the scores for skewness and kurtosis for the control, mediating, and dependent variables. Finally, a correlation analysis between mediating and dependent variables was conducted. The results revealed that identification and empathy were strongly correlated ($r = .86, p < .001$), indicating that those two scales are essentially measuring the same concept. Tabachnick and Fidell (2007) recommended that a principal components analysis should be performed to address collinearity. An exploratory factor analysis using principal components extraction and varimax rotation was conducted with the goal to group together the aforementioned variables. The analysis revealed four factors with eigenvalues greater than 1 accounting for 71.58% of the variance. Briefly, eigenvalues are useful in determining the number of factors that should be extracted for subsequent analysis. Eigen values greater than 1 are indicative of important components. Yet, the first eigenvalue accounted for 51.62% of the variance, whereas the other three factors did not account for much more of the variance. In light of this, a more accurate criterion for determining the number of the extracted factors is the scree test (Green & Salkind, 2011). Scree plots are helpful in visually inspecting which factors or components explain most of the variability. More specifically, the point of interest is where the smooth decrease of eigenvalues declines sharply and shows how many factors should be retained. In the current analysis, the scree plot showed that only one factor should be extracted, thus suggesting that the items from the identification and empathy scale could be combined into one variable. A new scale labeled “Empathic Identification” was created and showed high reliability levels (Cronbach’s $\alpha = .95, M = 4.65, SD = 1.15$). Consequently, the empathic identification scale was onwards employed in the mediation analyses (Table 2).

Table 2. Correlations between measured variables.

Variables	1	2	3	4	5	6	7	8	9	10
1. Transportation										
2. Empathic Identification	.70**									
3. Cognitive Responses	.07	.03								
4. Message Attitude	.58**	.39**	.17**							
5. Issue Attitude	.36**	.24**	.03	.62**						
6. Attitude toward sun protection	.44**	.31**	.03	.63**	.65**					
7. Behavioral Intentions	.55**	.40**	.18**	.58**	.54**	.60**				
8. Sun Protection Compliance Intentions	.51**	.39**	.17**	.52**	.48**	.48**	.77**			
9. Social Media Engagement	.47**	.40**	.13**	.29**	.01	.10*	.31**	.35**		
10. Intention to Share	.53**	.37**	.15**	.41**	.17**	.25**	.49**	.50**	.63**	

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

Section 1 - Manipulation Check

Message Type. Two independent-samples t -tests with message type as the independent variable were conducted to assess if participants correctly distinguished a narrative message from an informational one. As part of the posttest, two manipulation check items were used.

Specifically, participants were asked to evaluate on a 7-point scale if the message they read

“used a person’s story to present its claim.” The results confirmed that participants in the

narrative condition, indeed, evaluated the message as story-based ($M_{\text{narrative}} = 6.41$, $SD = .92$;

$M_{\text{informational}} = 2.11$, $SD = 1.66$), $t(54) = 13.34$, $p < .001$. The second manipulation item read:

“The message I just read used general information to present its claim.” Likewise, participants in

the informational condition ($M = 6.37, SD = 1.17$) rated the message as more informational compared with those reading the narrative message ($M = 3.44, SD = .30$), $t(57) = 8.18, p < .001$. Briefly, the analysis revealed that narrative messages were evaluated as being story-based, whereas informational messages were seen as including more factual-based information.

Health frame. To examine the effectiveness of the framing manipulation, two independent-samples t-tests with message health frame (gain vs. loss) as the independent variable were used. The first item asked participants to indicate on a 7-point scale if the information in the message was “Mostly Negative” or “Mostly Positive.” The results revealed that gain-framed messages were evaluated as containing positive information ($M_{gain} = 4.62, SD = 1.40$), whereas loss-framed messages were seen as negative ($M_{loss} = 3.13, SD = 1.31$), $t(67) = 4.55, p < .001$. To ensure that the manipulation was successful, a second item asked whether the “message emphasized the disadvantages from failing to take any precautions when in the sun or the advantages associated with taking precautions when in the sun.” Likewise, statistically significant differences were found for gain- ($M_{gain} = 2.75, SD = 1.85$) and loss-framed ($M_{loss} = 4.97, SD = 1.71$) messages $t(67) = 5.19, p < .001$.

Presentation format. A 2 (Presentation Format: Visual, Textual) x 2 (Response: Yes, No) chi-square was employed to examine if participants correctly identified whether the message contained visuals or relied on textual information. The analysis revealed that most participants in the visual condition (97.2%) answered that the message included a visual. On the other hand, all participants in the textual condition (100%) answered that the message used only verbal information $\chi^2(1, N = 69) = 65.11, V^* = .97, p < .001$. In sum, the results of all the manipulation check measures were successful.

Section 2. Main Effects and Mediation Effects Testing.

Main effects of message type. H1 posited that, compared to informational messages, narrative health messages would elicit more favorable attitudes toward: the message (H1a), issue (H1b), attitudes toward sun protection (H1c), behavioral intentions (H1d), and sun protection compliance (H1e). A multivariate analysis of covariance (MANCOVA) was conducted to examine this relationship, controlling for skin type and having a family member diagnosed with skin cancer, Wilk's $\Lambda = .96$, $F(5, 425) = 3.44$, $p < .01$, $\eta_p^2 = .04$). In partial support of H1, participants in the narrative condition ($M = 6.55$, $SE = .05$) experienced more favorable attitudes toward the issue than those in the informational condition ($M = 6.37$, $SE = .06$), $F(1, 429) = 5.38$, $p < .05$, $\eta_p^2 = .01$. The analysis also revealed that narrative health messages ($M = 5.79$, $SE = .09$) resulted in higher behavioral intentions than informational ones ($M = 5.55$, $SE = .09$), $F(1, 429) = 3.80$, $p = .05$, $\eta_p^2 = .01$. The results showed no significant main effects for attitudes toward the message, $F(1, 429) = .50$, $p = .48$), attitudes toward sun protection, $F(1, 429) = 2.30$, $p = .13$, nor sun protection compliance intentions, $F(1, 429) = 2.56$, $p = .11$. Briefly, it can be inferred that narrative health messages were more likely to induce attitudinal and behavioral changes than informational messages. Thus, H1b and H1d received support, while H1a, H1c and H1e did not. Table 3 reported the means and standard errors across experimental conditions.

Table 3. Means and standard errors of dependent and mediating variables by conditions.

Dependent Variables	Informational				Narratives			
	Gain		Loss		Gain		Loss	
	Text	Visual	Text	Visual	Text	Visual	Text	Visual
Message Attitude	6.02 (.10)	6.08 (.09)	5.82 (.15)	5.71 (.16)	5.78 (.12)	5.72 (.12)	5.94 (.12)	5.98 (.13)
Issue Attitude	6.38 (.11)	6.57 (.11)	6.30 (.14)	6.26 (.13)	6.61 (.07)	6.36 (.10)	6.55 (.11)	6.65 (.10)
Attitude towards Sun Protection	6.29 (.08)	6.34 (.10)	6.00 (.13)	5.82 (.14)	6.22 (.10)	6.10 (.12)	6.28 (.10)	6.28 (.12)
Behavioral Intentions	5.86 (.16)	5.85 (.14)	5.40 (.22)	5.13 (.20)	5.57 (.17)	5.45 (.16)	6.02 (.16)	6.07 (.15)
Sun Protection Compliance Intentions	5.56 (.14)	5.83 (.14)	5.45 (.18)	5.49 (.20)	5.49 (.15)	5.52 (.14)	5.94 (.15)	5.93 (.12)
Social Media Engagement	3.12 (.22)	3.21 (.25)	2.94 (.24)	3.57 (.25)	2.94 (.24)	3.39 (.26)	3.33 (.27)	2.99 (.28)
Intention to Share	4.50 (.21)	4.33 (.28)	4.20 (.25)	4.42 (.27)	4.17 (.25)	4.23 (.27)	4.85 (.23)	4.51 (.25)
Mediating Variables								
Transportation	4.82 (.12)	4.92 (.14)	5.00 (.13)	4.90 (.18)	5.06 (.12)	4.94 (.13)	5.27 (.14)	5.04 (.16)
Empathic Identification	4.25 (.14)	4.25 (.18)	4.31 (.18)	4.46 (.20)	4.95 (.13)	4.84 (.10)	4.98 (.14)	5.05 (.14)
Cognitive Responses	5.30 (.25)	5.44 (.25)	4.33 (.26)	3.68 (.26)	4.92 (.29)	5.16 (.29)	4.30 (.30)	4.11 (.26)

Note. Numbers in each cell are means, and those in parenthesis are standard errors.

Mediation effects. The next set of hypotheses explored whether transportation (H2), empathic identification (H3-H4), and cognitive responses (H5) would mediate the relationship between message type and the outcome variables (Table 4). First, the analyses employed a series of analysis of covariance (ANCOVAs) with message type as the independent variable and the proposed mediators as the dependent variables respectively, controlling for skin type and having a family member diagnosed with skin cancer. Then, a series of mediation analyses utilizing Haye’s PROCESS macro (2013) with 95% bias-corrected confidence intervals using 5,000

bootstrap resamples was employed to test whether the proposed mediators mediated the effect of message types on the dependent variables.

Transportation. H2 proposed that narrative health messages compared to informational messages would result in higher transportation. The analysis showed marginally significant differences among different message types, $F(1, 429) = 3.33, p = .07, \eta_p^2 = .01$. In particular, narrative messages led to higher transportation ($M = 5.08, SE = .07$) than informational messages ($M = 4.90, SE = .07$).

To explore the mediation path suggested by H2, Haye's PROCESS Macro- Model 4 (2013) was used to test the effects of transportation on the dependent variables. The results indicated that transportation was not a significant mediator on message attitude (H2a), issue attitude (H2b), attitudes toward sun protection (H2c), behavioral intentions (H2d), and sun protection compliance intentions (H2e). Hence, H2 was rejected.

Empathic Identification. The results showed that narrative health messages were associated with higher levels of empathic identification ($M = 4.97, SE = .70$) than informational messages ($M = 4.03, SE = .80$), $F(1, 429) = 39.50, p < .001, \eta_p^2 = .08$.

To further investigate this finding, the same PROCESS Model 4 was utilized. The analysis showed a significant indirect effect of empathic identification on: message attitude ($\beta = .22, SE = .04, 95\% CI: .15 \text{ to } .31$), issue attitude ($\beta = .09, SE = .03, 95\% CI: .05 \text{ to } .15$), attitudes toward sun protection ($\beta = .14, SE = .03, 95\% CI: .09 \text{ to } .21$), behavioral intentions ($\beta = .29, SE = .05, 95\% CI: .19 \text{ to } .42$), and sun protection compliance intentions ($\beta = .25, SE = .05, 95\% CI: .17 \text{ to } .36$). Therefore, H3 - H4 received support for all outcome variables (Figure 1-5).

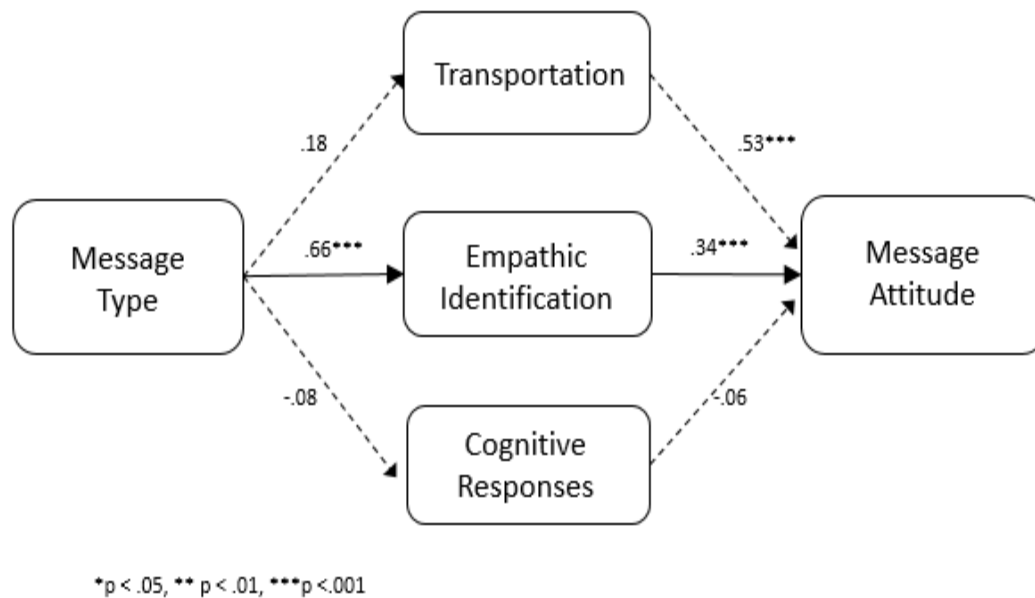


Figure 1. Mediation model of message type on message attitude through empathic identification. The model reports unstandardized regression coefficients.

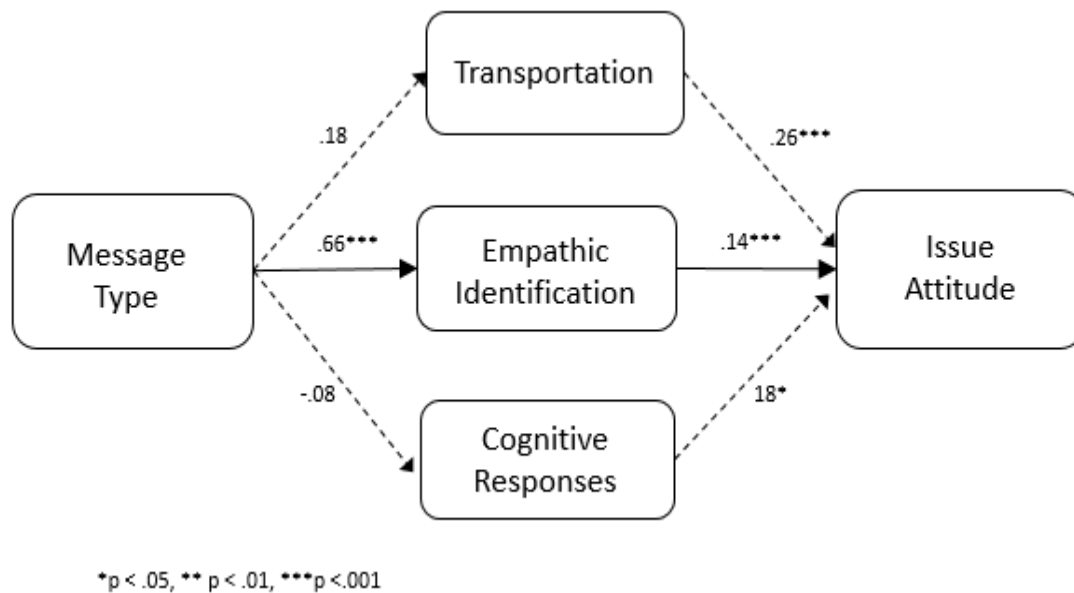
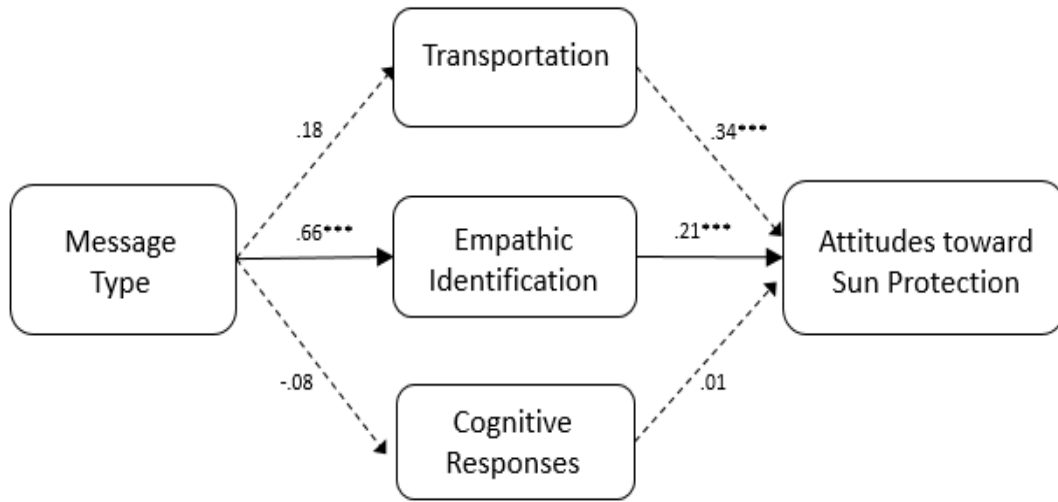
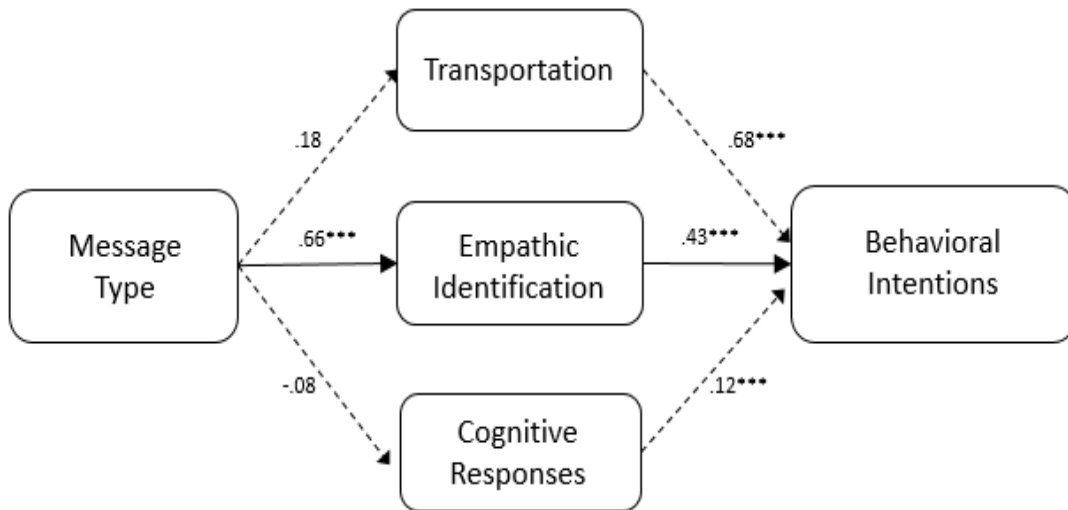


Figure 2. Mediation model of message type on issue attitude through empathic identification. The model reports unstandardized regression coefficients.



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

Figure 3. Mediation model of message type on attitudes toward sun protection through empathic identification. The model reports unstandardized regression coefficients.



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

Figure 4. Mediation model of message type on behavioral intentions through empathic identification. The model reports unstandardized regression coefficients.

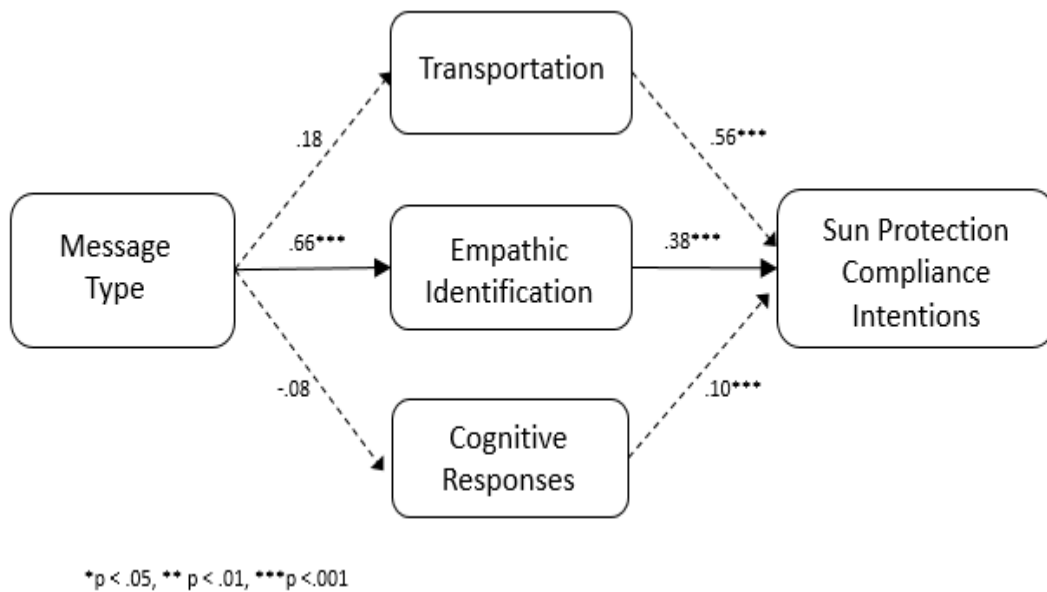


Figure 5. Mediation model of message type on sun protection compliance intentions through empathic identification. The model reports unstandardized regression coefficients.

Cognitive Responses. No significant results emerged from the ANCOVA test, as participants did not differ in terms of the cognitive responses they produced after reading either message type, $F(1, 429) = .18, p = .67, \eta_p^2 = .00$.

To further understand the relationship between message type and cognitive responses when reading health messages, a mediation analysis was conducted. The results showed that cognitive responses did not mediate the relationship between message type and the dependent variables. Based on the above, H5 was not supported.

Table 4: Indirect Effects of Message Type via Mediators.

Mediators	Effect (b)	Indirect Effect	
		95 % Confidence Intervals	
Dependent Variable: Message Attitude			
		LL	UL
Transportation	.09	-.01	.20
Empathic Identification	.22*	.15	.31
Cognitive Responses	-.01	-.04	.03
Dependent Variable: Issue Attitude			
Transportation	.05	-.002	.10
Empathic Identification	.09*	.05	.15
Cognitive Responses	-.0012	-.02	.0045
Dependent Variable: Attitudes toward Sun Protection			
Transportation	.06	-.002	.13
Empathic Identification	.14*	.09	.21
Cognitive Responses	-.0012	-.02	.004
Dependent Variable: : Behavioral Intentions			
Transportation	.12	-.01	.25
Empathic Identification	.29*	.19	.42
Cognitive Responses	-.01	-.06	.04
Dependent Variable: Sun Protection Compliance Intentions			
Transportation	.10	-.003	.22
Empathic Identification	.25*	.17	.36
Cognitive Responses	-.01	-.05	.03

Note. * $p < .05$.

Main effects of message health frame. H6 predicted that gained-framed health messages would be rated higher in terms of message attitude (H6a), issue attitude (H6b), attitudes toward sun protection (H6c), behavioral intentions (H6d), and sun protection compliance intentions (H6e) than loss-framed messages. The analysis did not reveal any significant main effects for message health frames, Wilk's $\Lambda = .98$, $F(5, 425) = 1.54$, $p = .18$ (Table 5). Hence, H6 did not receive support.

Table 5: Main Effects of Message Health Frame

Dependent Variables	Statistical Test	Effect Size	Hypotheses
Message attitude	$F(1,429) = .02, p = .88$	$\eta^2 = .00$	H6a
Issue attitude	$F(1,429) = .10, p = .75$	$\eta^2 = .00$	H6b
Attitude toward sun protection	$F(1,429) = 2.53, p = .11$	$\eta^2 = .01$	H6c
Behavioral intentions	$F(1,429) = .00, p = .96$	$\eta^2 = .00$	H6d
Sun Protection Compliance Intentions	$F(1,429) = 1.38, p = .24$	$\eta^2 = .00$	H6e

Main effects of presentation format. H7 proposed that messages with visuals would generate more positive attitudes toward the outcome measures. As presented in Table 6, none of the hypothesized effects were significant. Thus, H7 was not supported.

Table 6: Main Effects of Presentation Format

Dependent Variables	Statistical Test	Effect Size	Hypotheses
Message attitude	$F(1,429) = .00, p = .95$	$\eta^2 = .00$	H7a
Issue attitude	$F(1,429) = .08, p = .78$	$\eta^2 = .00$	H7b
Attitude toward sun protection	$F(1,429) = .34, p = .56$	$\eta^2 = .00$	H7c
Behavioral intentions	$F(1,429) = .29, p = .59$	$\eta^2 = .00$	H7d
Sun Protection Compliance Intentions	$F(1,429) = .69, p = .41$	$\eta^2 = .00$	H7e

Section 3. Interaction Effects between message type, message frame and presentation.

RQ1 asked if there is an interaction effect between message type, message frames and presentation format. After skin type and having a family member diagnosed with skin cancer were entered as covariates, a multivariate analysis of covariance (MANCOVA) was conducted to test the effects of the three independent variables to the outcome variables.

Results indicated that there were significant two-way interaction effects between message type and health frames, Wilk's $\Lambda = .95, F(5, 419) = 4.32, p < .001, \eta_p^2 = .05$ (Table 7). Post

hoc comparisons using the Bonferroni method indicated that gain-framed informational messages evoked more favorable attitudes toward the message ($M = 6.03, SE = .09$) than gain-framed narrative messages ($M = 5.76, SE = .09$). Conversely, the data showed an opposite pattern for the other dependent variables. In particular, participants reading loss-framed narratives ($M = 6.27, SE = .08$) had more positive attitudes toward sun protection than those reading loss-framed informational messages ($M = 5.93, SE = .08$). The univariate analysis for behavioral intentions also revealed that participants' ratings were higher for loss-framed narratives ($M = 6.05, SE = .12$) than loss-framed informational messages ($M = 5.28, SE = .12$). Similarly, loss-framed narratives ($M = 5.94, SE = .11$) resulted in more positive sun protection compliance intentions than loss-framed informational messages ($M = 5.47, SE = .11$). Finally, there were no significant differences for issue attitude (Figure 6-10).

Table 7: Two-Way Interactions between Message Type and Message Health Frame

Dependent Variables	Statistical Test	Effect Size
Message attitude	$F(1, 423) = 5.43, p < .05$	$\eta^2 = .01$
Issue attitude	$F(1, 423) = 2.21, p = .14$	$\eta^2 = .01$
Attitude toward sun protection	$F(1, 423) = 8.71, p < .01$	$\eta^2 = .02$
Behavioral intentions	$F(1, 423) = 19.19, p < .001$	$\eta^2 = .04$
Sun Protection Compliance Intentions	$F(1, 423) = 8.03, p < .01$	$\eta^2 = .02$

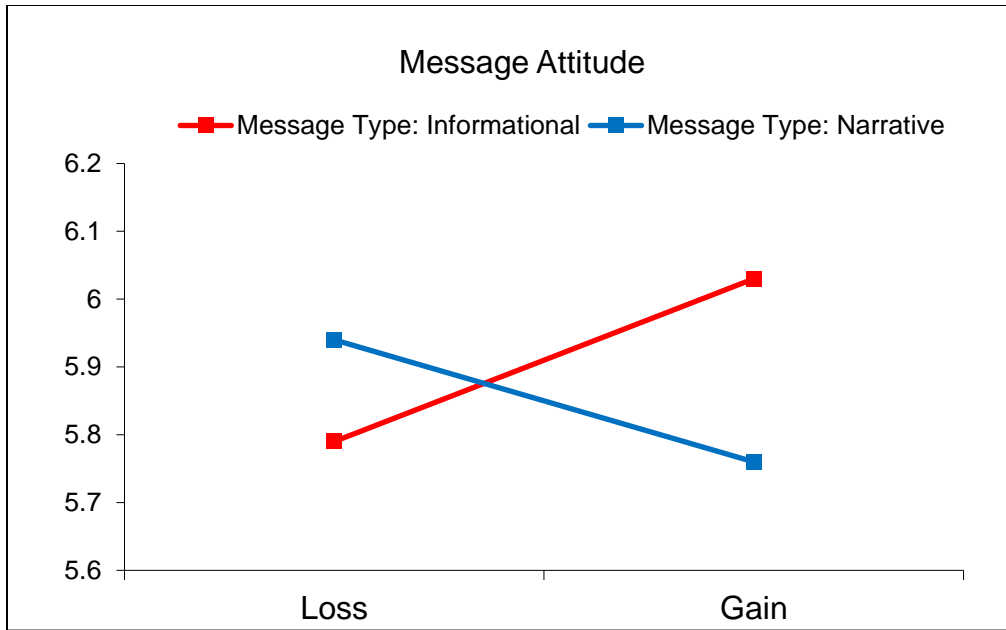


Figure 6. Message Type x Message Health Frame on Message Attitude.

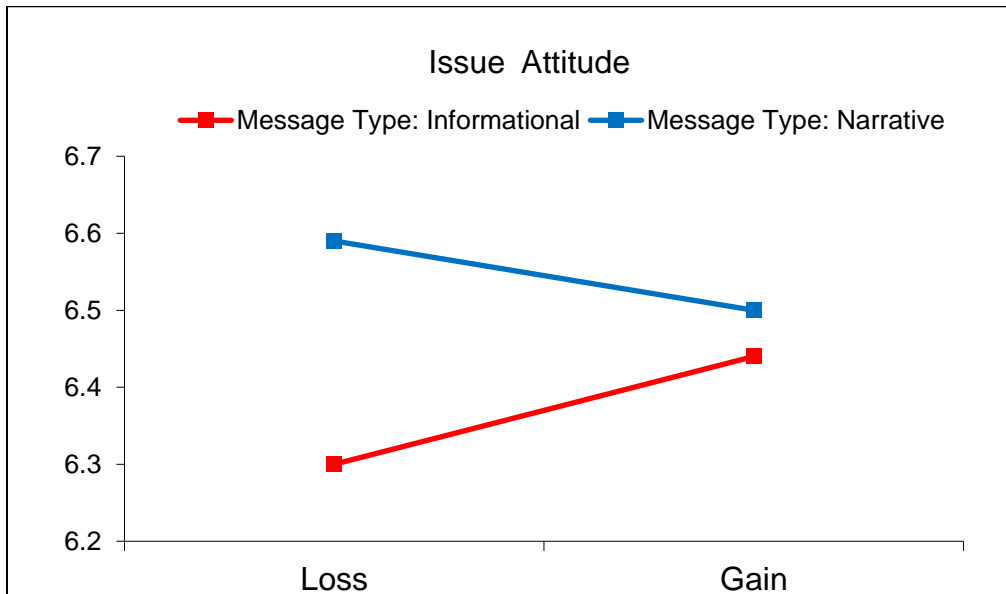


Figure 7. Message Type x Message Health Frame on Issue Attitude.

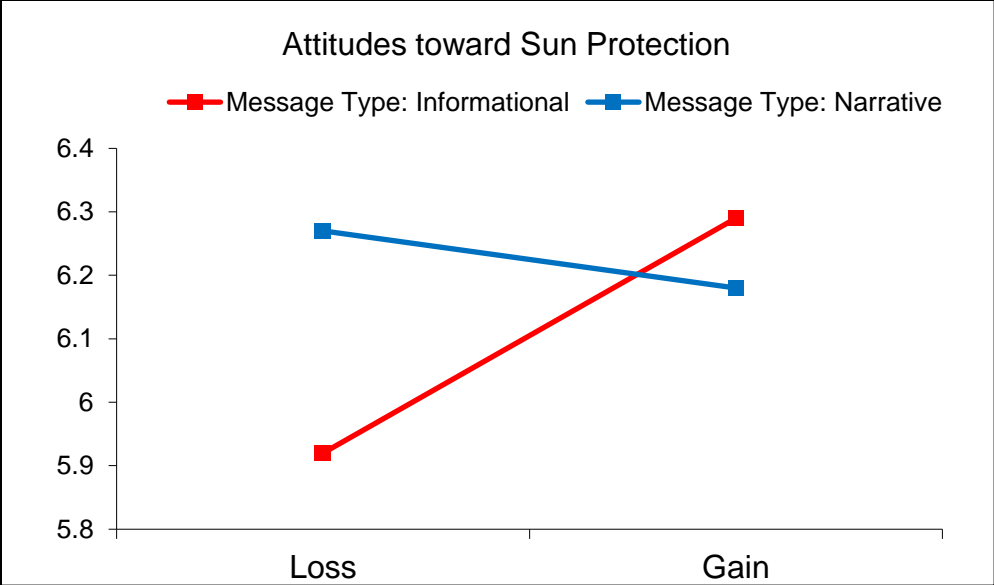


Figure 8. Message Type x Message Health Frame on Attitudes toward Sun Protection.

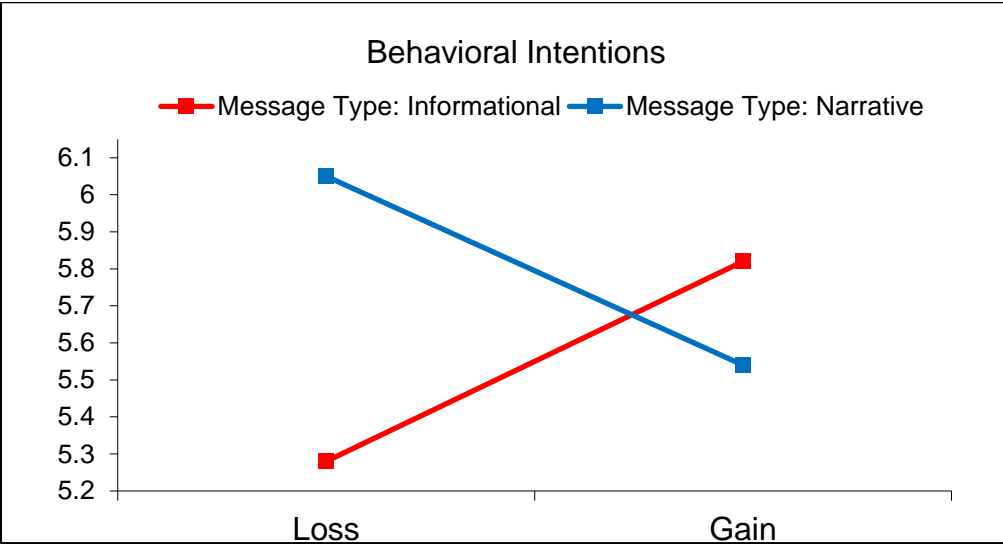


Figure 9. Message Type x Message Health Frame on Behavioral Intentions.

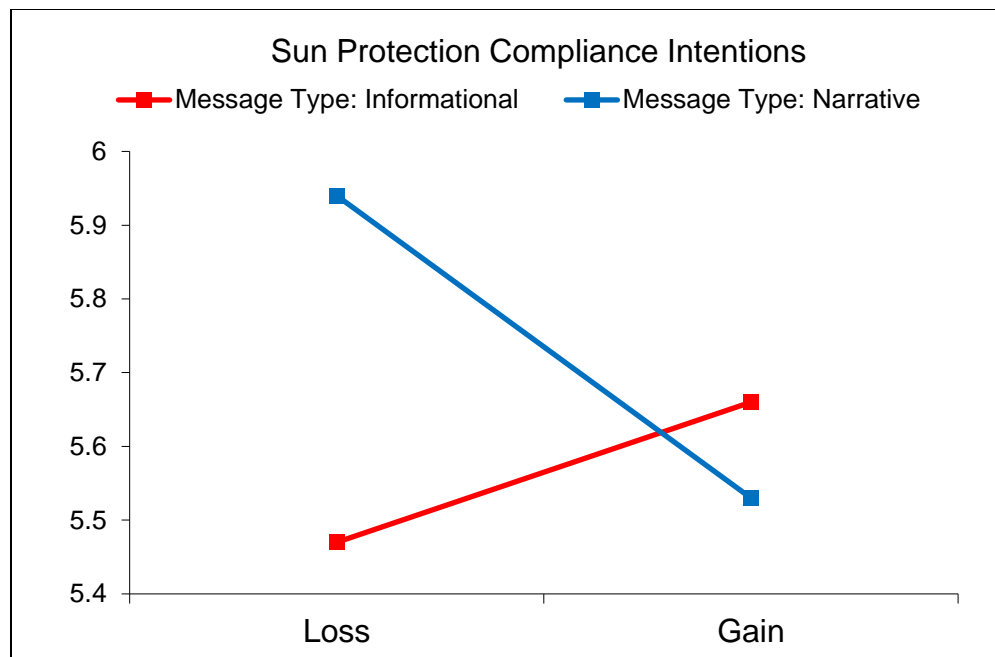


Figure 10. Message Type x Message Health Frame on Sun Protection Compliance Intentions.

Section 4. Social Media Engagement and Intentions to Share Health Information.

The second research question considered what type of health messages would lead to more social media engagement as well as intentions to share the advocated message information. Results from the MANCOVA test showed no significant difference for message type, neither for social media engagement $F(1,429) = .04, p = .85$, nor for intentions to share $F(1, 429) = .16, p = .70$.

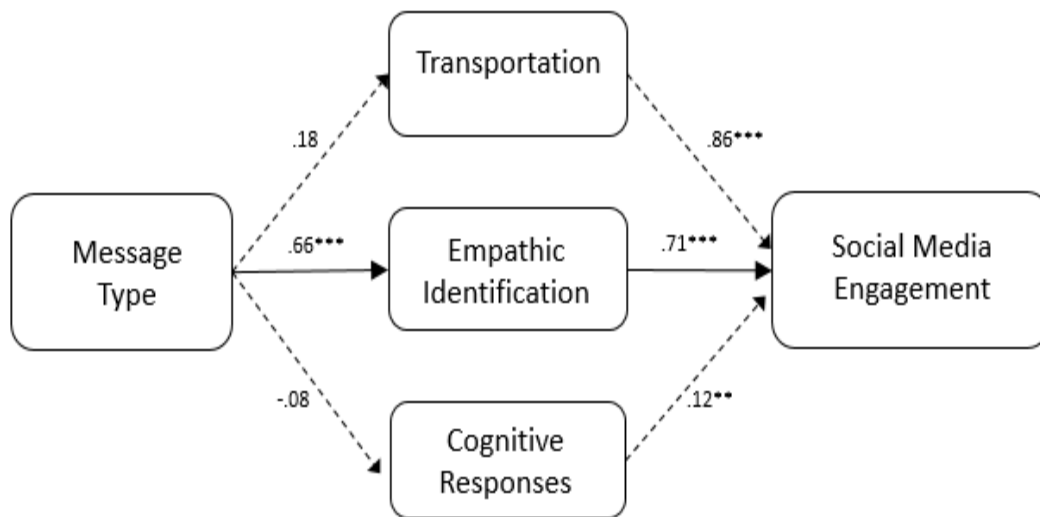
The analysis investigated the mediating role of transportation, empathic identification, and cognitive responses on the relationship between message type and social media engagement (Figure 11) as well as intentions to share the information contained in the message (Figure 12). The results indicated that only empathic identification was a significant mediator. Specifically, empathic identification ($\beta = .47, SE = .09, 95\% CI: .30 \text{ to } .68$) induced participants to “Like,” “Share,” and “Comment” on social media (Table 8).

Similar mediation results were found for one’s intention to share the information they had just read in the message, with empathic identification ($\beta = .41, SE = .08, 95\% CI: .27 \text{ to } .59$) serving as the only significant mediator. These results provided further support regarding the important role empathic identification plays in prompting individuals to take further action upon receiving a narrative message.

Table 8: Indirect Effects of Message Type via Mediators.

Mediators	Effect (b)	Indirect Effect	
		95 % Confidence Intervals	
Dependent Variable: Social Media Engagement			
		LL	UL
Transportation	.15	-.001	.33
Empathic Identification	.47*	.30	.66
Cognitive Responses	-.01	-.07	.03
Dependent Variable: Intention to Share			
Transportation	.17	-.01	.36
Empathic Identification	.41*	.27	.59
Cognitive Responses	-.01	-.06	.04

Note. * $p < .05$.



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

Figure 11. Mediation model of message type on social media engagement through empathic identification. The model reports unstandardized regression coefficients.

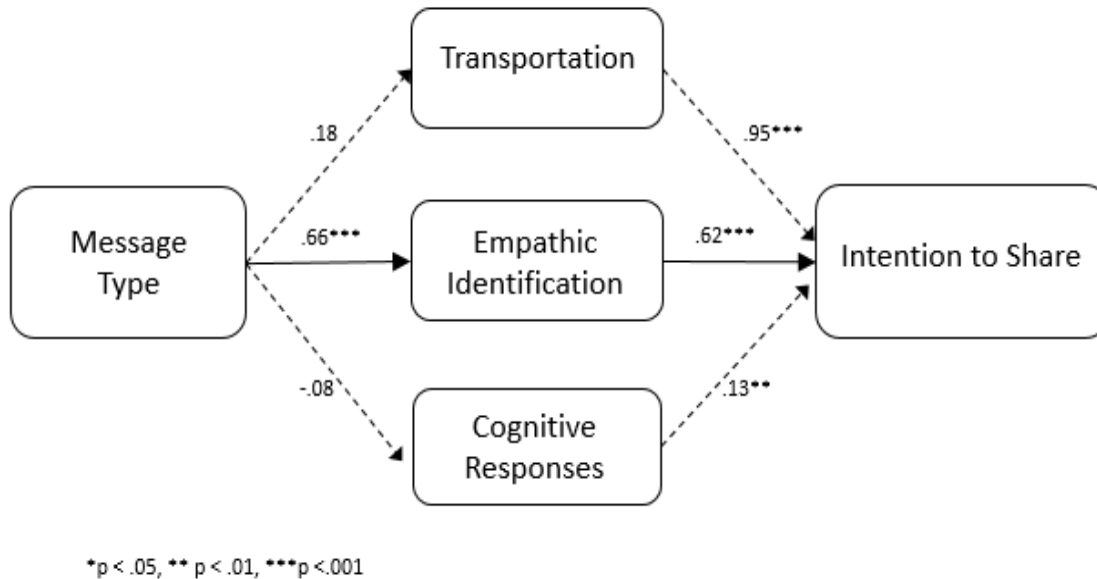


Figure 12. Mediation model of message type on intention to share through empathic identification. The model reports unstandardized regression coefficients.

Supplemental Analyses

Further analysis was conducted to determine whether there are any demographic differences on how individuals evaluated the different message types. A multivariate analysis of covariance (MANCOVA) was performed with gender and race as independent variables and message attitude, issue attitude, attitude toward sun protection, behavioral intentions, and sun protection compliance intentions as the dependent variables, controlling for skin type and having a family member diagnosed with skin cancer. The results did not find any significant main effect for gender, Wilk's $\Lambda = .99$, $F(5, 416) = .96$, $p = .44$, $\eta_p^2 = .01$, nor for race, Wilk's $\Lambda = .94$, $F(25, 1546) = 1.07$, $p = .37$, $\eta_p^2 = .01$. The interaction effect was not significant as well, Wilk's $\Lambda = .96$, $F(20, 1380) = .79$, $p = .73$, $\eta_p^2 = .01$.

Chapter 5

DISCUSSION

The purpose of this dissertation was to empirically test the combined effects of message types (narratives vs. informational), frames (gain vs. loss-framed), and presentation format (visuals vs. textual) in health promotion. Existing theory and research has suggested that narrative effectiveness stems from a confluence of factors such as their ability to reduce counterarguing (Da Cin, Zanna, & Fong, 2004), overcome resistance (Slater & Rouner, 1996), facilitate information processing by establishing parasocial connections with characters (Kreuter et al., 2007) and becoming memorable as it is easier for individuals to recollect a story than distinct arguments (Green & Brock, 2002).

In the present study, message types were operationalized in the form of either narrative or informational messages. Narratives communicated a character's experiences on the issue of sun protection, whereas informational messages relied on an authority figure, particularly, a dermatologist, who provided general tips about the promoted health behavior. In terms of the framing manipulation, gain-framed messages focused on the benefits from adopting sun-protective behaviors. Conversely, loss-framed messages emphasized the harmful effects from unprotected sun exposure. Lastly, presentation format was manipulated by adding pictures to the message or by merely using a textual format.

This study brings a new perspective to the extant literature by showing that narratives are more influential in encouraging prevention behaviors such as sun protection. In a nutshell, four main findings emerged from this study. First, the findings provided further support to the notion that narrative messages are more likely to induce favorable attitudinal and affective reactions than their informational counterparts. Secondly, it shed light on the underlying psychological

mechanisms in narrative persuasion by indicating that empathic identification plays a key mediating role in health narratives. Thirdly, an interaction effect was found between message type and health frames, with loss-framed health stories, overall, being more effective in delivering information about preventive behaviors than gain-framed stories. Finally, it provided evidence that the concreteness and vividness of a narrative message might obviate any visual effects as audiences are more likely to centrally process the conveyed information by paying close inspection to the message than using heuristic cues such as images.

Narratives vs. Informational Messages

The findings add to the accumulating evidence that narratives are more powerful than non-narratives in evoking attitudinal and behavioral changes (Oliver, Dillard, Bae & Tamul, 2012; Shen et al., 2014), especially when conveying health risks compared to their informational counterparts (De Wit et al., 2008; Gardner & Leshner, 2016). They also extend our understanding about narrative effects in health communication by providing additional evidence to the postulation that narratives can change an individual's cancer-related beliefs and encourage health behaviors (Green, 2006; Murphy, Frank, Chatterjee, & Baezconde - Garbanati, 2013). The study's results lend support to a recent meta-analysis showing that narratives are more influential in health communication than information messages (Shen et al., 2015). Similar to Gardner and Leshner (2016) who examined narrative effects in promoting preventive health behaviors such as exercise and health diet for people diagnosed with diabetes, it was shown, that participants who received information in a narrative format produced more positive attitudes and greater behavioral intentions toward sun protection. Finally, the data indicated that participants did not differ in terms of their involvement level toward the advocated health issue. These results

corroborate similar findings from Braverman (2008) who found that narrative messages are more convincing when delivered to individuals low in issue involvement. Conceptually, these findings can be interpreted in view of the fact that this was an online experiment and participants were randomly recruited from a crowdsourcing platform such as Amazon's M-Turk. Hence, it was less likely to display strong preexisting attitudes toward sun protection than individuals who might have had a family member or friend diagnosed with skin cancer.

Framed Health Messages

A primary goal of this dissertation was to examine whether there was an interaction between message types, health frames, and presentation format. The analysis did not reveal any significant differences when all different message types were classified into gain- and loss-framed messages. However, some intriguing patterns were revealed after categorizing them into gain- and loss-framed narrative and informational messages. Based on theory and empirical evidence, this study hypothesized that gain-framed narratives would be more persuasive for delivering preventive health information than loss-framed ones. Contrary to our predictions, the findings showed that loss-framed messages were more likely to induce changes toward the issue, sun protection, and also convince individuals to comply with the promoted behavior. An important stream of research has provided evidence that gain-framed messages are more successful in encouraging preventive behaviors than loss-framed messages (Gray & Harrington, 2011; O'Keefe & Jensen, 2007; Rothman & Salovey, 1997). Contrary to our predictions, the findings indicated that narrative messages using loss-frames were more effective in promoting sun protection attitudes than gain-framed appeals. These results are in contrast to previous findings by Gray and Harrington (2011) suggesting the superiority of gain-framed narratives in

promoting positive beliefs about preventive health behaviors. Yet, this group of researchers used exercise as the advocated preventive behavior and relied on a student sample. Past research in the realm of sun protection and skin cancer investigating differently framed messages also demonstrated similar findings by showing that women reading gain-framed messages were more prone to adopt sun protective behaviors than women in the loss-framed condition (Rothman, Salovey, Antone, Keough, & Martin, 1993). In a meta-analysis of the cumulative effects of gain- and loss-framed messages, O’Keefe and Jensen (2007) reported that gain-framed appeals were slightly more persuasive in promoting disease prevention messages. Nevertheless, the same researchers suggested that their findings should be interpreted with caution since the statistical difference might be attributed to the prevalence of experimental studies focusing on dental hygiene behaviors. Within this context, it is evident that the advocated health behavior moderates the framing effects.

Contrary to the overarching assumptions in the framing literature, this study showed the superiority of loss-framed than gain-framed narratives by demonstrating that stories containing negatively framed information are more powerful, even when advocating preventive health behaviors like sun protection. In light of the foregoing discussion, we might infer that people process narrative evidence differently than factual evidence, thus mitigating any distinct framing effects that derive from different health behaviors. One of the main premises in the narrative literature pertains to the fact that narratives convey a person’s real life experiences, and thus it is difficult to dismiss or discount them. Based on our data, it appears that the combination of narrative characteristics (e.g. plot, character, plausibility) with negative information can render them successful tools for promoting preventive health messages. This study illustrated that the *negativity bias* might be also applicable in narrative persuasion. According to this concept,

people are more cognitively attentive to negative information during information processing than equivalent positive information (Meyerowitz & Chaiken, 1987). The findings provided empirical support to the theoretical postulation by Green (2006) that narratives facilitate the mental rehearsal of issues as individuals who envision themselves suffering from cancer are more willing to comply with preventive behaviors. When individuals are not prepared to cope with personal fears about an illness, they can vicariously experience them through the lens of the narrative character.

Our findings provided partial support to those reported by Wirtz & Kulpavaropas (2014), in their study about narrative effects in promoting healthy eating and physical activity among Hispanic adults. Contrary to our findings, this study did not detect any differences between narrative and nonnarrative message formats in terms of promoting healthy eating and physical activity. Interestingly enough, those researchers also reported that gain-framed messages led to more positive attitudes toward the message, whereas loss-framed messages were more likely to influence behavioral outcomes. A possible explanation might be that loss-framed messages are more effective because of the inclusion of an affected character who conveyed the dangers from not taking precautionary sun protection measures. This assumption is consistent with research in news reporting indicating that journalists frequently include real-life characters who are representative of the covered issue because of the entertaining, dramatic, and emotional attributes they entail (Zillmann, Gibson, Sundar, & Perkins, 1996). Along these lines, research in social psychology has also suggested that people have the tendency to process and encode into their brain information that is novel or unexpected (Lang, 2000). The verisimilitude of the main character in the story, along with the damaging effects from failing to protect from sunlight, might explain the impact of the loss-framed narratives. Although more research is needed to

provide definitive conclusions, the findings provided preliminary evidence that negatively-framed stories might be considered for promoting preventive health behaviors.

Identification

This study also sheds further light on the underlying psychological mechanisms through which narratives function. Consistent with predictions derived from the narrative literature, the results supported the view that identification with characters can influence participants' future health behaviors (Igartua & Casanova, 2016; Kreuter et al, 2008). Kreuter and colleagues (2008) found that women who identified with cancer survivors were more inclined to develop positive thoughts toward the story. Yet, participants in their study were comprised of African American females who viewed stories from African American breast cancer survivors. Similarly, experimental research examining the efficacy of different message types demonstrated that narratives featuring a homosexual character diagnosed with hepatitis B virus (HBV) led participants, who were either bisexual or homosexual men, to show higher behavioral intentions than their counterparts in the nonnarrative condition (De Wit et al., 2008). This dissertation extends this line of research by providing evidence that identification is, overall, an important component for narrative effectiveness in health communication, even for demographically diverse audiences.

Recent research in entertainment-education (E-E) television programs has also highlighted the role of identification with characters in reducing resistance to persuasion. Generally speaking, E-E programs can increase awareness and knowledge about social and health issues by portraying characters as either vulnerable or in position to overcome challenges, thereby enhancing viewer motivation to enact the advocated behavior. This could be explained

through the lens of social cognitive theory which maintains that individuals acquire, reduce or discontinue behaviors by vicariously observing models (Bandura, 1986). It should be noted, however, that identification with television characters is facilitated by viewers' pre-existing similarity or likeness of the featured characters as they willingly watch those programs. In fact, research on narrative persuasion has suggested that identification moderates individuals' attitudinal and behavioral effects and their influence depends on the extent to which they are emotionally connected with characters (Moyer-Gusé, Chung, & Jain, 2011). For example, Moyer-Gusé and Nabi (2010) examined the effects of the television series *The OC* (about unplanned pregnancies) and indicated that narratives led to higher levels of identification with the character than nonnarrative messages, which, in turn resulted in higher future safe sex intentions. This study extends the current literature by showing that identification can mediate the relationship between narratives and preventive health behaviors, irrespective of whether message recipients a priori perceive themselves as similar to the story characters. Instead, it seems that the realness and concreteness of the conveyed narrative message, along with the negative information that is accentuated by the richness of the provided details, suffice to influence preventive health behaviors.

Empathy

Broadly speaking, scholars have suggested that emotional responses influence attitudinal and behavioral outcomes (Dillard & Nabi, 2006; Oatley, 2002; Witte, 1992) as well as human judgment when decisions involve risk (Lerner, Gonzalez, Small, & Fischhoff, 2003). In the context of narratives, it is theorized that emotions are basic components in the persuasion process as one's affective state is affected by the emotions that the character in the story experiences

(Oatley, 2002). In short, there is growing evidence about the impact of emotions in narrative effectiveness (Oliver et al., 2012; Shen et al., 2014; Volkman & Parrott, 2012). Volkman and Parrott's (2012) work on positive and negative emotions in osteoporosis narratives found compelling evidence by demonstrating that the emotions expressed within narratives are transferred to message recipients by evoking equivalent emotional responses.

Although discrete emotions (e.g. happy, fear, anger) have been previously studied in narrative persuasion (Murphy et al., 2013; Oliver et al., 2012; Volkman & Parrott, 2012), less is known about the effects of empathy. Thus, the present study predicted that individuals in the narrative condition would produce empathic feelings toward the character, which in turn, would induce changes in beliefs and attitudes. The findings showed that empathy and identification were highly correlated. It appears that identification with characters elicits empathic feelings towards them and vice versa.

Consistent with prior research, the findings confirmed that empathic feelings toward the character mediated the persuasive effects of narratives (Oliver et al., 2012; Shen et al., 2014). For example, a study by Oliver et al. (2012) found that narrative news stories led readers to develop more empathy toward the character in the story, which in turn, resulted in positive attitudes toward stigmatized groups such as immigrants or homeless people. Likewise, another study focusing on how framing a political issue in news narratives affects one's cognitive and affective reactions showed that empathy had a significant impact on readers' issue attitudes (Shen et al., 2014). Since previous studies have primarily examined empathy in news articles, this study furthers our understanding by investigating its mediating effects in the context of health communication. Finally, the data showed that empathic feelings can elicit not only more

favorable attitudes toward the advocated health issue but also make people positively predisposed toward the message and influence behavioral outcomes.

Transportation

Generally speaking, it is argued that transportation facilitates the immersion of individuals into the story, makes story characters more sympathetic, and diminishes one's ability to counterargue due to the implicit nature of the conveyed arguments, thereby inducing stronger attitudinal and behavioral changes (Green, 2006; Kreuter et al., 2007). In a series of experiments, Green and Brock (2000) demonstrated that transported individuals into a narrative produced story-relevant beliefs and evaluated more positively the characters in the story. Contrary to the assumption that transported individuals would be more prone to adopt cancer-relevant beliefs and change health behaviors (Green, 2006), this study found that transportation did not mediate the effects of message type on the outcome variables. These findings contradict those by Dunlop and colleagues (2010) who documented that narrative-based health promotion messages about skin cancer transported readers into the story, which, in turn, evoked more favorable attitudes toward skin protection as well as higher intentions to comply with the advocated behavior.

Conversely, there is evidence that transportation is not necessarily associated with changes in one's attitudes and behaviors. For instance, Murphy et al. (2013) indicated that individuals from different ethnic/racial groups were affected differently by transportation after watching a narrative film about cervical cancer, however, no significant differences were detected in terms of their attitudes toward the issue and behavioral intentions. Research in narrative news reported similar findings by demonstrating that transportation did not mediate the relationship between narrative news articles and readers' attitudes toward the covered issue

(Shen et al., 2014). In a nutshell, the results of this study showed that narrative messages can still shift participants' opinions toward the advocated health behavior through pathways other than transportation.

Cognitive Responses

Since a key objective in this study was to provide a better understanding about the mechanisms associated with narrative persuasion, the impact of cognitive responses was also scrutinized. Specifically, it was hypothesized that narratives would trigger more supportive cognitive reactions than informational messages. In contrast to previous findings, the data showed no significant differences between message types. Although the findings of this study have shown that empathic identification plays a key mediating role, they run counter to the suggestions of some scholars that this can trigger greater cognitive elaboration that can eventually result in more positive attitudes toward the advocated issue (Cohen, 2001; Igartua & Casanova, 2016). On the contrary, our data revealed that narratives elicited instead affective reactions as readers empathized with the character in the story.

There is empirical evidence demonstrating that when the combined mediating effects of cognitive responses and empathy were tested on narrative messages regarding a social issue, only the latter led to changes in attitudes (Mazzocco, Green, Sasota, & Jones; 2010). However, in a study examining narrative effects on skin cancer prevention, Dunlop et al. (2010) demonstrated that transported individuals produced more favorable cognitive responses regarding the recommended sun protection behaviors than those receiving the informational message. Since the current study did not find any significant effects neither for transportation nor for cognitive

responses, in conjunction with the findings from prior studies, we could argue that a theoretical link might exist between those two mediators which they seem to operate together.

Presentation Format

Prior research has provided extensive evidence in regards to the influential role of visuals in health communication (e.g. Hammond et al., 2004), especially in the context of skin cancer prevention (McWhirter & Hoeffman-Goetz, 2012). Hence, RQ1 inquired whether there are any interaction effects between message type, frames and presentation format on message recipients' attitudes and behavioral intentions regarding sun protection.

The results did not reveal any significant impact neither on message and issue evaluation nor any interaction effects relevant to the role of visuals in narrative persuasion. This unexpected finding contradicts the *picture superiority effect* that perceives pictures as more powerful in eliciting attitudinal reactions than textual information (Pieters & Wedel, 2004), especially when accompanying health messages (Garcia - Retamero & Cokely, 2011). The results also contradict meta-analytic data reported by Shen et al. (2015) who found that narrative health messages imparted through video or audio channels had a greater suatory impact than text-based ones. These findings are also in contrast to the assumption that incorporating graphic images in stories can influence behavioral outcomes (Niederdeppe et al., 2008). A plausible explanation might pertain to the fact that the used pictures, particularly those in the loss-framed condition, were not very graphic in nature. Pictures in this study were primarily complementary to textual information. Perhaps, more evocative and larger images would have yielded the opposite results. Indeed, a review about health warnings on tobacco packages revealed that larger warnings are more successful in promoting health behaviors such as smoking cessation (Hammond, 2011).

Similarly, a study examining the impact of anti-tobacco television ads showed that graphic ads portraying illnesses elicited negative emotions like fear and anger and thus were more persuasive than their humorous counterparts (Biener et al., 2004). In another study, a group of researchers randomly assigned participants to videos presenting information about the negative outcomes associated with unprotected exposure to the sun (Cody & Lee, 1990). Compared to informational videos, it was shown that emotional videos were more successful in increasing skin protection behaviors.

Conversely, the results partially support some of the finding reported by Seo and colleagues (2013), who suggested that adding visuals to loss-framed messages might trigger reactance, thus attenuating their persuasive effects. Yet, the exploratory nature of this study requires further scholarly attention to shed more light on the combined effects of narratives, health frames, and visuals. Future work should examine how role gain and loss-framed visuals that accompany narrative messages influence narrative mediators such as reactance and resistance.

Social Media Engagement and Intentions to Share Health Information

This dissertation also asked what message type is more likely to prompt individuals to seek additional information on the recommended health behavior as well as to engage with the message on social media. The findings are consistent with those reported by Moyer-Gusé et al. (2011) who demonstrated that after watching an episode from the series *Sex and the City* wherein the protagonists discussed sexually-transmitted infections (STIs), viewers who showed higher levels of identification enhanced their self-efficacy, which, in turn urged them to participate in discussions with others about the discussed health behavior. The findings, however, contradict

prior research indicating that transportation encourages individuals to engage in information seeking about the recommended health behavior (Murphy, Frank, Moran, & Patnoe - Woodley, 2011).

This dissertation also adds to the literature by showing what type of health messages audiences are predisposed to share on social media. Based on the data, narrative messages that trigger empathic identification with story characters can prompt audiences to engage with those messages on social media by either commenting, liking, or sharing them. In line with Myrick and Oliver (2015), it was found that emotionally intense messages urged individuals to take action by sharing the health information to others. Given the flexibility that the Internet provides, health communicators, advertisers, and public relations practitioners should use all tools at their disposal (e.g. videos, photos) to create messages that will resonate with their target audiences and motivate them not only to adopt the recommended health behavior but share such content online as well as discuss it offline.

Theoretical Implications

Taken together, the results are consistent with previous research documenting narrative superiority over nonnarrative message types (Oliver et al., 2012; Shen et al., 2014). First, the findings add to existing knowledge by providing empirical evidence that narratives, compared to informational messages, are more effective in health promotion messages (De Wit et al., 2008; Gardner & Leshner, 2016; Green, 2006; Murphy et al., 2013; Shen et al., 2014). A large body of research has suggested that individuals are willing to adopt health behaviors based on the perceived risk associated with engaging in the behavior (Rothman & Salovey, 1997). Broadly speaking, people take risks if the recommended health behavior includes potential unpleasant

outcomes, whereas they are risk-averse when there is low risk of unpleasant outcomes to occur. Detection behaviors are perceived as risky in light of one's fear to be diagnosed with an illness, whereas prevention behaviors are less risky as there is little cost from not complying with the advocated behavior. In light of the precedent discussion, the data revealed some unexpected findings that are not consistent with the framing literature about the prevalence of gain-framed messages in promoting preventive behaviors. Alternatively, our findings showed that loss-framed health messages are more successful in promoting preventive behaviors such as a sun protection. Broadly speaking, it is posited that narrative effectiveness derives from their ability to convey arguments by concealing their persuasive intent and thus reducing reactance, counterarguing, or resistance. Contrary to the predictions that were made in line with the framing literature, we can infer from the findings that loss-framed narratives were more effective in accentuating the harmful effects of the sun by urging participants to implicitly mentally rehearse the issue and subsequently indicate higher behavioral intentions, albeit sun protection is a preventive behavior (Detweiler et al., 1999; Rothman, Bartels, Wlaschin, & Salovey, 2006). To the best of the author's knowledge, this is one of the first experimental attempts investigating the impact of framed narrative messages in the realm of health communication. It is important to highlight, though, that the findings of the current study compared two different types of message evidence (narratives vs. informational), whereas the framing literature has primarily focused on non-narrative messages. In addition, we should exercise caution in generalizing these findings to other health behaviors (e.g. detection, cessation) since this study provided preliminary results that could be only applicable in promoting a preventive health behavior. Hence, these intriguing findings warrant further theoretical inspection by testing and juxtaposing their effects in diverse preventive and detective health behaviors.

Secondly, this study also provides initial evidence about visual effects in narrative health messages. Previous studies have shown that visuals can affect health behavioral outcomes (Schneider et al., 2001; Seo et al., 2013). Surprisingly, the findings indicated that narratives were equally effective regardless of the presentation format. Theoretically, this unexpected result raises the question of what type and/or size of visuals health communicators should integrate into messages to propagate successful messages. Perhaps, crafting stories wherein images are dominant and narratives are presented in a sequence of captions that accompany the visual might produce the opposite effects. Health communicators could easily implement this given the flexible delivery format of the Internet. A plausible explanation for the absence of visual effects is that the employed images were not very graphic in nature, especially in the loss-framed narrative condition. For instance, past research has proposed that evocative images of diseases can augment the audience's reactions (Biener et al., 2004). It should be mentioned that messages in the visual condition featured only four small images. Using more and larger images might have triggered different cognitive and affective audience reactions.

Finally, one of the most important findings pertains to the mediating role of empathic identification in health narrative persuasion. To date, the literature has predominantly investigated empathy only in the context of news narratives or examined the impact of discrete emotions such as fear and anger (e.g. Volkman & Parrott, 2012; Murphy et al., 2011). Theoretically, this study describes the psychological pathways through which framed health narratives work. Consequently, study results extend the literature by showing that empathic feelings toward the character mediate the relationship between narrative health messages and behavioral outcomes. Given that there is little academic attention so far on the role of empathy in narrative health communication, more research is required to further our understanding by

examining the interplay between empathy and identification in differential health behaviors and contexts.

The present findings also delve into the mediating role of identification as it was shown that it can trigger positive message attitudes and health behaviors when loss-framed narratives are used to advance preventive behaviors. Based on the above, it appears that the conceptual relationship between the constructs of empathy and identification is not as clear. For example, Kreuter et al. (2007) suggested that identification with characters in a story heightens susceptibility, which, in turn, elicits empathic feelings towards those diagnosed with cancer. Hence, further research is necessary to theoretically disentangle this interdependent relationship in health promotion. This pattern of results underscore that, together, identification and empathy might enhance the efficacy of narrative health messages, thus rendering them successful in the promotion of preventive health behaviors.

Practical Implications

On the whole, the findings of this study provide insight into designing effective health behavior interventions and risk communication messages. It appears that the plausibility, vividness, and concreteness of stories conveying one's actual experiences resonates with audiences and can motivate them to perform health behaviors such as taking precautions when under the sun. Given the information-cluttered online ecosystem, the findings suggest that audiences appreciate and become cognitively vigilant when encountering health content that emphasizes the human factor. In sum, study findings showed that loss-framed narratives led to higher ratings of attitudes toward sun protection, behavioral intentions, and sun protection compliance intentions than loss-framed informational messages. For health communicators, the

results of this study illustrate that they should craft narrative health messages featuring affected individuals as they are more effective than other types of evidence in prevention campaigns. It seems that the vulnerability of a character pertaining to the promoted health behavior make the story and the health outcomes feasible and thus, resonates better with individuals than messages focusing on either healthy individuals or merely relying on general information about a health topic. To date, it seems that the websites of the National Cancer Institute and the American Cancer Society place more emphasis on expert opinions and key statistics in educating the public about the deleterious effects associated with unprotected sun exposure. In addition, many uploaded cancer-related videos feature experts offering sun-safety tips or convey statistical evidence. Yet, incorporating narratives into online and offline health campaigns might bring additional benefits by having individuals tell their personal stories based on their experiences. Such narratives could be incorporated into traditional communication channels like brochures, or even infographics. To reach a broader audience with different media consumption preferences, health organizations should also create multimedia stories such as YouTube videos of cancer survivors to provide first-hand testimonials and rich details about their pre- and post- cancer lifestyles.

The importance of including skin cancer survivors in health narratives is also evident in the psychological mechanisms through which attitudinal and behavioral modifications took place in this study. As the data showed, empathy and identification are critical components in narrative persuasion as they can change one's health beliefs and attitudes. It is recommended that health organizations should create health messages that facilitate the audience's empathic identification with characters. Another notable finding is that empathic identification is important in urging individuals to talk about the advocated health behavior to family and friends, but also engage

with those messages in social media. Hence, it is necessary to design narrative messages that feature strong characters to cognitively and affectively influence the audience's responses and increase the likelihood of adopting the recommended health behavior. Yet, future research should explore the impact of personal characteristics of narrative characters to identify what particular attributes are responsible for urging people to identify and empathize with them.

These findings entail important practical, health as well as social implications, considering that younger adults are not only more active on social media but also susceptible to skin cancer (Duggan, 2015; American Cancer Society, 2017). Researchers should also consider how different age-groups, races, and individuals from diverse socioeconomic backgrounds perceive health content distributed in a narrative or statistical fashion. In conclusion, future studies could benefit from conducting a qualitative analysis of the social media of major health organizations to understand how audiences react and share online health information.

Limitations

Although this study provided some interesting findings, there are several limitations that are worthy our consideration. This study used participants' from Amazon's Mechanical Turk than college students to obtain a more representative sample of the U.S. population. Studies have documented that, overall, results from M-Turk are reliable and generalizable for social scientific research. However, the fact that participants participated in a non-controlled experimental setting makes them vulnerable to external distractions. On the other hand, we could argue that the fact that the employed visuals did not influence participants' beliefs and attitudes might be testament that they scrutinized the messages instead of heuristically processing them.

Another notable limitation relates to the fact that individual characteristics were not taken into consideration in the analyses. Prior studies have shown that issue involvement can moderate the efficacy of narrative messages (Braverman, 2008). Furthermore, research about narrative influence on the issue of cervical cancer found that people from different ethnic/racial backgrounds expressed distinct cognitive and affective responses to narratives (Murphy et al., 2013). Other studies have documented that there are gender differences in narrative processing (Cody & Lee, 1990; Murphy et al., 2013). Although the study controlled for skin color, no further analysis was conducted to examine the potential impact of skin type or gender on the dependent variables. Nonetheless, the study sample lacked racial diversity as 79% of the participants self-described as “White/Caucasian.” Another shortcoming is that the internal consistency of the *sun protection compliance intentions* scale that measured one’s intentions to follow the three recommended precaution behaviors was not very high (.68) compared with other scales. Perhaps, participants were more inclined to adopt a particular behavior over another.

In conclusion, the findings showed no empirical support for the mediating role of transportation. A plausible explanation might be that this study did not measure participants’ “transportability,” that is, the extent to which one is predisposed to become absorbed into stories (Dal Cin et al., 2004). It might be possible that participants who register higher levels of transportation might have followed different persuasion paths. Yet, the lack of support for transportation has been manifested in other studies as well (Shen et al., 2014). In all, more research is required to arrive at definitive conclusions about the effects of framed health messages.

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APPENDIX A: STIMULI

Visual gain-framed narrative

One person's story on how to protect your skin from the sun rays

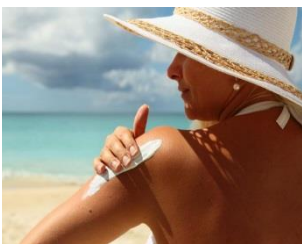
Jennifer McNair is an accountant from Philadelphia, P.A. and like nearly 143 million other Americans, she loves spending time outdoors because it makes her feel good physically and mentally. But in order to maintain a healthy lifestyle and enjoy the sunlight, sun protection should become a part of your daily habit, especially when engaging in outdoor recreation like walking, running or biking wooded trails.



The 45-year-old mother of two boys is known to her friends for her passion for outdoor activities and her beautiful and radiant skin. What differentiates McNair from other outdoor enthusiasts is her slavish devotion to sun protection that helps her soak up the sun while maintaining healthy skin. “People compliment me for how my skin looks and I always urge them to adopt my sun-protection habits such as shade, sunscreen, and clothing,” she said.

It was back in 1997 during her honeymoon in Florida when McNair got a bad sunburn and ended up in the hospital. “This experience was a wake-up call. Since then, I religiously follow a simple three-step process to safely enjoy the outdoors and keep my skin healthy and glowing for years to come,” she said. McNair participates in outdoor recreation throughout the year but makes sure it happens only during non-peak hours to protect her skin. “I am addicted to the outdoors. But I know that the sun is at its peak between 10 a.m. and 3 p.m., so I always seek shade during that time,” she said.

After consulting with her dermatologist, the second precaution she takes is to apply sunscreen with Sun Protection Factor (SPF) of 15 to 50 for more effective protection. “One of the best ways to maintain my skin healthy is by wearing sunscreen before going out,” McNair said. “It is part of my daily routine: I brush my hair, brush my teeth, and then I apply my sunscreen.” According to the Skin Cancer Institute, people who use sunscreen daily increase their chances of maintaining younger-looking skin by 76 percent.



By practicing sun protection year-round, McNair has smooth, silky and youth-looking skin despite the long hours she spends outdoors. One of the reasons is because she dresses herself in proper clothing before going outdoors. “The last step I take is to wear protective clothing to protect my body from the sun,” she said. McNair also said that she made a habit of wearing wide-brimmed hats (3-inch or greater) during outdoors recreation, as they cover areas where people forget to apply sunscreen including the tops of the ears and back of the neck.

In the United States, the rate of skin cancer is rising, as approximately 8,500 people are diagnosed daily. One in five Americans will develop skin cancer in their lifetime and one person dies every hour from melanoma, the deadliest form of skin cancer, reports the American Cancer Society.

Whatever your age and gender, experts recommend adopting the following three behaviors for better sun protection: First, seek shade when staying outside, especially during midday when the sun rays are at their highest intensity. Second, 30 minutes before going outdoors, apply 1 ounce of sunscreen with an SPF of at least 15. Reapply every two hours if you are swimming or sweating. And third, wear darker-colored, heavy-weight, tightly-woven fabrics such as polyester, nylon, or wool.

Visual loss-framed narrative

One person's story on how overexposure to sun rays can cause skin cancer

Jennifer McNair is an accountant from Philadelphia, P.A. and like nearly 143 million other Americans, she loves spending time outdoors because it makes her feel good physically and mentally. But poor lifestyle choices, especially when engaging in outdoor recreation like walking, running or biking the wooded trails, make us vulnerable to cumulative damage caused by the sunlight.



The 45-year old mother of two boys is known to her friends for her passion for outdoor activities, but also as a champion of skin cancer awareness.

What differentiates McNair from other outdoor enthusiasts is that she just underwent her fourth surgery in 12 years in her long battle with skin cancer. “I had 23 areas on my body removed. “Next time you want to frolic in the sun, I want you to think of my story,” McNair said. It was back in 2005 when she was diagnosed with basal cell carcinoma, a type of skin cancer that occurs on areas of the skin that are exposed to the sun. “I repeatedly failed to take any precautions such as shade, sunscreen, or clothing to protect my skin,” she said.

McNair acknowledges that participating in outdoor recreation during peak-sun hours throughout the year increased her chances of getting skin cancer. “I was addicted to the outdoors. Even when the sun was at its peak between 10 a.m. and 3p.m., I never sought shade,” she said.

McNair let out a long sigh when talking about the consequences from not properly using sunscreen. “I was wearing sunscreen with Sun Protection Factor (SPF) of less than 15 or didn't wear any at all when going out,” she said. “I wish sunscreen was part of my routine then. Now my skin is prematurely aged and I'm fighting skin cancer.” According to the Skin Cancer Institute, people who do not use sunscreen daily show 24 percent more skin aging than those who do use.



McNair didn't practice sun protection despite the long hours she used to spend outdoors. “I was never wearing any protective clothing and left my body exposed to the sun,” she sighed. McNair also regrets not wearing wide-brimmed hats (3-inch or greater) during outdoors recreation, leaving her face, neck and ears, areas commonly affected by sunlight, exposed. She now has a large scar on her forehead because the doctor had to remove a nerve so he could blitz the cancer. Five months later, she hasn't regained the feeling in her left cheek. She also has a 3” scar and a 2-1/2” scar on her chest and indentations from where the cancer was removed.



In the United States, the rate of skin cancer is rising, as approximately 8,500 people are diagnosed daily. One in five Americans will develop skin cancer in their lifetime and one person dies every hour from melanoma, the deadliest form of skin cancer, reports the American Cancer Society.

Whatever your age and gender, experts warn that failing to adopt the following three behaviors can lead to skin cancer: First, not seeking shade when staying outside, especially during midday when the sun rays are at their highest intensity. Second, not applying 1 ounce of sunscreen with SPF of at least 15 about 30 minutes before going outdoors. Also, failing to reapply every two hours when swimming or sweating. And third, wearing light-colored, lightweight and loosely-woven fabrics such as bleached cotton, and shiny or lustrous semi-synthetic like rayon.

Text gain-framed narrative

One person's story on how to protect your skin from the sun rays

Jennifer McNair is an accountant from Philadelphia, P.A. and like nearly 143 million other Americans, she loves spending time outdoors because it makes her feel good physically and mentally. But in order to maintain a healthy lifestyle and enjoy the sunlight, sun protection should become a part of your daily habit, especially when engaging in outdoor recreation like walking, running or biking wooded trails.

The 45-year-old mother of two boys is known to her friends for her passion for outdoor activities and her beautiful and radiant skin. What differentiates McNair from other outdoor enthusiasts is her slavish devotion to sun protection that helps her soak up the sun while maintaining healthy skin. "People compliment me for how my skin looks and I always urge them to adopt my sun-protection habits such as shade, sunscreen, and clothing," she said.

It was back in 1997 during her honeymoon in Florida when McNair got a bad sunburn and ended up in the hospital. "This experience was a wake-up call. Since then, I religiously follow a simple three-step process to safely enjoy the outdoors and keep my skin healthy and glowing for years to come," she said. McNair participates in outdoor recreation throughout the year but makes sure it happens only during non-peak hours to protect her skin. "I am addicted to the outdoors. But I know that the sun is at its peak between 10 a.m. and 3 p.m., so I always seek shade during that time," she said.

After consulting with her dermatologist, the second precaution she takes is to apply sunscreen with Sun Protection Factor (SPF) of 15 to 50 for more effective protection. "One of the best ways to maintain my skin healthy is by wearing sunscreen before going out," McNair said. "It is part of my daily routine: I brush my hair, brush my teeth, and then I apply my sunscreen." According to the Skin Cancer Institute, people who use sunscreen daily increase their chances of maintaining younger-looking skin by 76 percent.

By practicing sun protection year-round, McNair has smooth, silky and youth-looking skin despite the long hours she spends outdoors. One of the reasons is because she dresses herself in proper clothing before going outdoors. "The last step I take is to wear protective clothing to protect my body from the sun," she said. McNair also said that she made a habit of wearing wide-brimmed hats (3-inch or greater) during outdoors recreation, as they cover areas where people forget to apply sunscreen including the tops of the ears and back of the neck.

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McNair let out a long sigh when talking about the consequences from not properly using sunscreen. "I was wearing sunscreen with Sun Protection Factor (SPF) of less than 15 or didn't wear any at all when going out," she said. "I wish sunscreen was part of my routine then. Now my skin is prematurely aged and I'm fighting skin cancer." According to the Skin Cancer Institute, people who do not use sunscreen daily show 24 percent more skin aging than those who do use.

McNair didn't practice sun protection despite the long hours she used to spend outdoors. "I was never wearing any protective clothing and left my body exposed to the sun," she sighed. McNair also regrets not wearing wide-brimmed hats (3-inch or greater) during outdoors recreation, leaving her face, neck and ears, areas commonly affected by sunlight, exposed. She now has a large scar on her forehead because the doctor had to remove a nerve so he could blitz the cancer. Five months later, she hasn't regained the feeling in her left cheek. She also has a 3''scar and a 2-1/2''scar on her chest and indentations from where the cancer was removed.

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Visual gain-framed informational

Enjoy the benefits of skin protection by protecting yourself from the sun

Americans are known for their passion for outdoor activities and every year nearly 143 million of them spend time in the nature because it makes them feel good physically and mentally. In order to maintain a healthy lifestyle and enjoy the sunlight, sun protection should become a part of your daily habit, especially when engaging in outdoor recreation like walking, running or biking wooded trails.

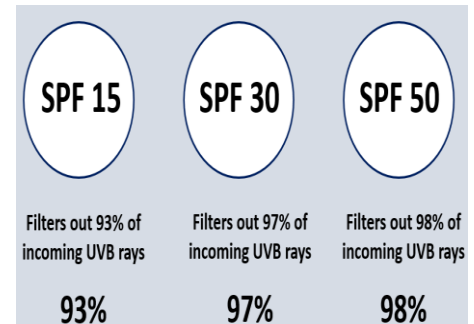


Dr. Christina Smith, a dermatologist at Columbia University Medical Center offers tips on what you can do to protect yourself from the sun rays. “Adopting sun protection habits such as shade, sunscreen, and clothing is the best way to enjoy the sun safely and keep your skin healthy and glowing for years to come,” Dr. Smith said.



She emphasized that to maintain a beautiful skin and prevent skin cancer you should seek shade throughout the year during periods of peak sunlight, even when engaging in outdoor activities such as running or walking around outdoor shopping centers. “Protecting yourself from the sun rays, especially during the peak hours of 10 a.m. and 3 p.m., is the most effective way to prevent skin cancer,” Dr. Smith said.

Using sunscreen every day, even if it’s cloudy, is beneficial to the skin. Generously applying sunscreen replenishes and nourishes your skin and helps you achieve a healthier, younger-looking complexion. “As dermatologists, we have been saying for many years that for adequate protection everyone over the age of six months, even people with darker skin, should use sunscreen daily, all year round and in any weather,” Dr. Smith said. Sunscreens with Sun Protection Factor (SPF) of 15 to 50 increase the likelihood of keeping your skin healthy and your life long. According to the Skin Cancer Institute, people who use sunscreen daily increase their chances of maintaining younger-looking skin by 76 percent. “SPF 30 will give you 90 percent protection, and SPF 50 will give you 98-99 percent protection,” Dr. Smith said.



Wearing protective gear in the sun such as long-sleeved shirts, long pants, sunglasses and hats is the best means of sun protection. Dr. Smith said that “The more skin you cover, the better. Choosing the right clothing is really important and can make a difference on how well your skin is protected.” And added, “If you hold a fabric up to the light and you cannot see right through it, UV rays cannot get through.” Dermatologists also suggest to wear wide-brimmed hats (3-inch or greater) during outdoors recreation, as they cover areas where people forget to apply sunscreen including the tops of the ears and back of the neck.

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Visual loss-framed informational

Consequences of not protecting your skin from the harmful effects of the sun

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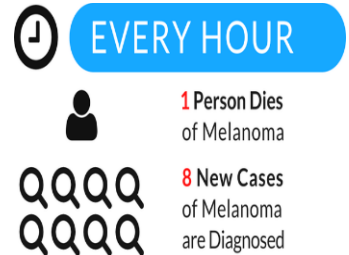
Dr. Christina Smith, a dermatologist at Columbia University Medical Center, warns about the undesirable consequences from exposing yourself to the sun's harmful rays. "Not adopting sun protection habits such as shade, sunscreen, and clothing increases the likelihood of premature skin aging and cancer," Dr. Smith said.

She emphasized that failing to seek shade throughout the year during periods of peak sunlight, even when engaging in outdoor activities such as running or walking around outdoor shopping centers, increases your risk of skin cancer. Not protecting yourself from the sun rays, especially during the peak hours of 10 a.m. and 3 p.m., adds up over time and can cause significant sun-damage and accelerated photoaging," Dr. Smith said.



Also, failing to wear sunscreen every day, even if it's cloudy, may lead to skin damage and can be life-threatening. Skin exposed to ultraviolet (UV) radiation without applying sunscreen can get you sunburns and blisters and eventually freckles and rashes. "As dermatologists, we have been saying for many years that failing to use sunscreen daily, all year round and in any weather has really negative effects for everyone who is over the age of six months, even for people with darker skin," Dr. Smith said. Sunscreen use with Sun Protection Factor (SPF) of less than 15 can lead to serious skin damage and cancer. According to the Skin Cancer Institute, people who do not use sunscreen daily show 24 percent more skin aging than those who do use.

Another factor that can put you at greater risk of developing skin cancer is not wearing protective gear in the sun such as long-sleeved shirts, long pants, sunglasses and hats. Dr. Smith said "The less skin you cover, the more in danger you are. You should also know that not all fabrics are good and failing to wear the right clothing can leave your skin exposed to sunlight." And added, "If you can see light through a fabric, UV rays can get through too." Dermatologists say that not wearing wide-brimmed hats (3-inch or greater) will leave your face, neck and ears exposed, areas that are the most commonly affected by sun rays.



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Another factor that can put you at greater risk of developing skin cancer is not wearing protective gear in the sun such as long-sleeved shirts, long pants, sunglasses and hats. Dr. Smith said "The less skin you cover, the more in danger you are. You should also know that not all fabrics are good and failing to wear the right clothing can leave your skin exposed to sunlight." And added, "If you can see light through a fabric, UV rays can get through too." Dermatologists say that not wearing wide-brimmed hats (3-inch or greater) will leave your face, neck and ears exposed, areas that are the most commonly affected by sun rays.

In the United States, the rate of skin cancer is rising, as approximately 8,500 people are diagnosed daily. One in five Americans will develop skin cancer in their lifetime and one person dies every hour from melanoma, the deadliest form of skin cancer, reports the American Cancer Society.

Whatever your age and gender, experts warn that failing to adopt the following three behaviors can lead to skin cancer: First, not seeking shade when staying outside, especially during midday when the sun rays are at their highest intensity. Second, not applying 1 ounce of sunscreen with SPF of at least 15 about 30 minutes before going outdoors. Also, failing to reapply every two hours when swimming or sweating. And third, wearing light-colored, lightweight and loosely-woven fabrics such as bleached cotton, and shiny or lustrous semi-synthetic like rayon.

APPENDIX B: MEASURES

Manipulation Check

Narratives manipulation

- 1. The message I just read used a person’s story to present its claim.
- 2. The message I just read used general information to present its claim.

Manipulation Check

Framing manipulation

- 1. The information in the message I just read was:
- 2. Did the message emphasize the disadvantages from failing to take any precautions when in the sun or the advantages associated with taking precautions when in the sun?

Manipulation Check

Visuals manipulation (Y/N)

- 1. The message I just read included pictures

Cognitive Responses

Please write down up to 5 thoughts/ feelings you had when reading this health message. State your thoughts and ideas as concisely as possible. A phrase is sufficient. Ignore spelling, grammar, and punctuation. Use enter (return) to separate your thoughts. Please take 2-3 minutes to do this.

List your thoughts below, and indicate if your thought is negative or positive to the issue.

Indicate below if your thought is positive, negative or neutral to taking sun-protection measures.

1 st thought:	<input type="checkbox"/> positive <input type="checkbox"/> negative <input type="checkbox"/> neutral
--------------------------	--

2 nd thought:	<input type="checkbox"/> positive <input type="checkbox"/> negative <input type="checkbox"/> neutral
--------------------------	--

3 rd thought:	<input type="checkbox"/> positive <input type="checkbox"/> negative <input type="checkbox"/> neutral
--------------------------	--

4 th thought:	<input type="checkbox"/> positive <input type="checkbox"/> negative <input type="checkbox"/> neutral
--------------------------	--

5 th thought:	<input type="checkbox"/> positive <input type="checkbox"/> negative <input type="checkbox"/> neutral
--------------------------	--

Message Attitude

The message is...

1. Not credible...Very credible
2. Not believable...Very believable
3. Not truthful... Very Truthful
4. Not persuasive... Very persuasive
5. Not convincing... Very convincing
6. Not informative... Very informative
7. Not interesting... Very interesting
8. Not clear... Very clear

Issue Attitude

Taking precautions when staying in the sun is...

1. Bad...Good
2. Foolish... Wise
3. Unfavorable...Favorable
4. Negative...Positive
5. Undesirable...Desirable
6. Unnecessary...Necessary
7. Detrimental...Beneficial

Attitudes towards sun protection

1. Protecting my skin from the sun is an easy way to stay healthy
2. Spending time in the sun without protection can increase my chances of developing skin cancer
3. Using sunscreen lotion allows me to enjoy the outdoors with less worry
4. Spending time in the sun without any protection can increase my chances of developing cancer
5. My skin won't wrinkle as fast if I spend less time in the sun

Behavioral Intention

1. I intend to act in ways that are compatible with the position advocated by the message.

2. I plan to act in ways that are consistent with the position advocated by the message.
3. I am going to make an effort to do what the message asked me to do.

Sun Protection Compliance Intentions

How likely are you to perform the following behaviors in the future?

1. Use sunscreen before I participate in outdoor activities.
2. Seek shade during peak sunlight hours.
3. Wear protective clothing before I participate in outdoor activities.

Social Media Engagement

1. “Like” this message on social media.
2. “Share” this message on social media.
3. “Comment” on this message on social media.

Intention to share

1. Talk to a friend or family member about this message

Transportation

1. I could picture myself in the scene of the events described in the narrative.
2. I was mentally involved in the narrative while reading it.
3. I wanted to learn how the narrative ended.
4. The narrative affected me emotionally.
5. While reading the narrative I had a vivid image of Katie.
6. The events in the message are relevant to my everyday life.

Identification

1. While reading the message, I felt as if I was part of the action.
2. While reading the message, I forgot myself and was fully absorbed.
3. I was able to understand the events in the message in a manner similar to that in which the main character understood them.
4. I think I have a good understanding of the main character.
5. I tend to understand the reasons why the main character does what she does.
6. While reading the message I could feel the emotions of the main character portrayed.
7. While reading the message, I felt I could really get inside the main character’s head.
8. At key moments in the message, I felt I knew exactly what the main character was going through.
9. While reading the message, I wanted the main character to succeed in achieving her goals.
10. When the main character succeeded I felt joy, but when she failed, I was sad.

Empathy

Affective Empathy

1. The character’s emotions are genuine.
2. I experienced the same emotions as the character when reading this message.
3. I was in a similar emotional state as the character when reading this message.
4. I can feel the character’s emotions.

Cognitive Empathy

5. I can see the character's point of view.
6. I recognize the character's situation.
7. I can understand what the character was going through in the message.
8. The character's reactions to the situation are understandable.

Associative Empathy

9. When reading the message, I was fully absorbed.
10. I can relate to what the character was going through in the message.
11. I can identify with the situation described in the message.
12. I can identify with the character in the message.

Covariates

1) Family member diagnosed with skin cancer

Do you have any family-member or friend diagnosed with skin cancer? Y/N

2) Skin type

- A) Always burns
- B) Burns easily
- C) Burns moderately
- D) Burns minimally
- E) Rarely burns
- F) Never burns

Demographics

1. Please indicate your gender (male/female)?

2. What is your age? (Please enter in numbers). For example, if you are 20-years old, enter the number 20 in the box below.

3. What race group do you belong to? African American, Asian / Asian American, American Indian / Alaska Native, Native Hawaiian / Other Pacific Islander, White/ Caucasian, Hispanic / Latino, Other.

4. Please indicate your education level. Less than high school, High school / GED
Some college, 2-year college degree, 4-year college degree, Master's degree, Doctoral degree, Professional degree (MD, JD).

5. Please indicate which of the following category best describes your family's household income before taxes: Less than \$ 20,000, \$20,001 to \$30,000, \$30,001 to \$45,000, \$45,001 to \$60,000, \$60,001 to \$80,000, \$80,001 to \$100,000, more than \$100,000.

VITA

Michail Vafeiadis

Assistant Professor, School of Communication & Journalism, Auburn University

Email: michail.vafeiadis@gmail.com

EDUCATION

- Ph.D. in Mass Communications, Penn State University, 2017
- M.A. in Journalism, Emerson College, 2012
- M.A. in Political Science, Suffolk University, 2008
- B.A. in International Affairs, Suffolk University, 2006

TEACHING

- COMM410: International Mass Communications, Spring 2017
- COMM 420: Research Methods in Advertising and Public Relations, Fall 2006

SAMPLE PUBLICATIONS

- **Vafeiadis, M.**, Li, R., & Shen, F. (forthcoming). Narratives in political advertising: An analysis of the political advertisements in the 2014 midterm elections. *Journal of Broadcasting & Electronic Media*.
- Ott, H. K., **Vafeiadis, M.**, & Kumble, S., & Waddell, F. (2016). The effect of message interactivity on product attitudes and purchase intentions. *Journal of Promotion Management*. 22(1), 89-106.
- DiStaso, M. W., **Vafeiadis, M.**, & Amaral, C. (2015). Managing a health crisis on Facebook: How the response strategies of apology, sympathy, and information influence public relations. *Public Relations Review*, 41(1), 222-231.

SAMPLE CONFERENCE PAPERS

- Brummette, J., DiStaso, M., **Vafeiadis, M.**, Messner, M., & Flynn, T. (2017, August). *Read all about it: The politicization of "fake news" on Twitter*. Paper to be presented at the Association for Education in Journalism and Mass Communication Conference, Mass Communication and Society Division, Chicago, IL.
- Xiao, A., Li, R., Yang, G., & **Vafeiadis, M.** (2017, August). *Native advertising on social media: The effects of company reputation, perceived relevance, and privacy concerns*. Paper to be presented at the Association for Education in Journalism and Mass Communication Conference, Advertising Division, Chicago, IL.
- **Vafeiadis, M.** (2016, March). *The role of dialogue in enhancing relational outcomes in the health sector*. Paper presented at the International Public Relations Research Conference, Miami, FL.

SERVICE AND AWARDS

- Don Bartholomew Award for Excellence in Public Relations Research, Sponsored by Ketchum Global Research & Analytics and the Institute for Public Relations, 2016.
- Managing Editor, *Journal of Information Policy*, August 2014 – August 2016.
- Top Student Paper Award, 1st place, Public Relations Division, Association for Education in Journalism & Mass Communication, 2014.