ABSTRACT

Title of Document: SCENE MATTERS: STRATEGIC USE OF SIMILARITY AND FRAMING IN NARRATIVE RISK COMMUNICATION

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Human health risks and environmental risks are different and are perceived differently; health risks primarily threaten human health, whereas environmental risks threaten both human *and* environmental health. Nonetheless people tend to view environmental risks as impersonal, primarily threatening nonhuman elements or distant others, making it difficult for risk communicators to motivate target audiences to take risk-mitigating actions.

This dissertation argues that because environmental risks threaten both health and the environment, messages about this category of risk can be framed in either a health or an environmental context as a means of altering risk perceptions. It is further asserted that, all things being equal, message features that are more or less relevant to either the health or the environmental frame will achieve different results depending on which message frame is used. As a means of investigating this claim, two types of similarity (demographic similarity and scene similarity) were manipulated in a 2 (risk frame: health,

environmental) × 2 (demographic similarity: high, low) × 2 (scene similarity: high, low) between-subjects experiment (N = 568), in which participants were exposed to a message about drought framed as either a health or an environmental risk.

The results show that scene similarity interacts with the two message frames (health and environmental) for narrative persuasion and behavior-related variables. Specifically, high (versus low) scene similarity resulted in better persuasive outcomes for the health frame than for the environmental frame, whereas low (versus high) scene similarity resulted in better persuasive outcomes for the environmental frame than for the health frame. Additionally, the study found that framing an environmental risk as a health risk increased behavioral intention and behavioral expectation. Furthermore, high (versus low) personal relevance improved risk perception, narrative persuasion, behavioral intention and expectation, and response efficacy.

The study has implications for health and environmental risk communication, particularly for impersonal risks that people perceive to be of low personal relevance, and opens up new avenues for research and practice in areas such as climate change communication and entertainment-education. Limitations, implications, and recommendations for replications and extensions are discussed.

SCENE MATTERS: STRATEGIC USE OF SIMILARITY AND FRAMING IN NARRATIVE RISK COMMUNICATION

By

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Dedication

I dedicate this dissertation to my mom, dad, husband, daughter, brother, and niece, and to my Village, that is, all the people who supported me in one way or another along this journey, particularly those who prayed me through it.

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takes a village to get a Ph.D. To my village: this one's for you!

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List of Abbreviations

AB	abstract
CC	climate change
CI	consequences immediate
DRT	drought
DS	demographic similarity
EA	extent affected
EH	extreme harm
EMP	environment more than people
FLD	flood
GW	global warming
HPC	high pollen count
HW	heat wave
ID	identification
LA	likelihood affected
LS	large scale
PA	possibility affected
PERS	persuasiveness
POC	people in other countries
PR	personal relevance
PS	personal steps
RA	risk affected
REIe	Rational Experiential Inventory (experiential subscale)
REIr	Rational Experiential Inventory (rational subscale)
SEV	severity
SKP	skepticism
SNC	serious negative consequences
SR	Self-referencing
SS	Scene similarity
SUS	susceptibility
TOR	tornado
TR	transportation
WNV	West Nile Virus
WT	work together

Chapter 1: Human Health vs. Environmental Risk Perception

> When people fail to be alarmed about a risk or hazard, they do not take precaution. We should find ways to evoke visceral reactions towards the risk; perhaps by simulations of its concrete future consequences for people's home or other regions they visit or value.
>
> Elke U. Weber (2006, p.103)

The above quotation from Elke U. Weber highlights a critical challenge faced by environmental risk communicators: how to motivate people to mitigate a risk that they do not perceive as a problem. Weber (2006) suggested finding ways to show people the enormity of the threat, perhaps through scenes that depict devastation in places that they value. Although this may be a reasonable strategy for increasing perceptions of risk, if people are not convinced that the risk *directly* (and perhaps immediately) affects their personal health and wellbeing, they may still remain indifferent to the risk (see Kahlor, Dunwoody, Griffin, & Neuwirth, 2006; Maibach, Roser-Renouf, & Leiserowitz, 2008). Convincing people that an environmental risk directly affects their personal health has been suggested as a strategy for combatting environmental risk apathy and engendering risk mitigating and adaptation actions (see for example, Frumkin Hess, Luber, Maililay, & McGeehin, 2008; Semenza, Ploubidis, & George, 2011).

Helweg-Larsen (1999) found that personal experience with a hazard can increase perception of risk, but that does not help the vulnerable who have not yet had the benefit of hindsight. Weber (2010) suggested that vicarious experience can be used to alter perceptions of risk, and although he suggested this be done through statistical description, a meta-analysis by Reyna, Nelson, Han, and Dieckmann (2009) showed that people generally lack numeracy skills that would help them make wise decisions about personal health risks. This dissertation investigates altering the levels of specific elements in a

narrative message about an environmental risk as a means of altering risk perception. Risk perception is central to risk communication because of its crucial role as a mediator between attitude and behavior change (Roser-Renouf & Nisbet, 2008; Sjöberg, 2000a, 2000b, 2004).

In the field of risk communication, several theories predicting risk-related attitude and behavior have been used to guide the development of persuasive risk messages. Notably, theories of this type, such as the Health Belief Model (HBM; Janz & Becker, 1984; Rosenstock, 1966), and the Extended Parallel Process Model (EPPM; Witte, 1994) were derived for health risks (e.g., HIV, heart disease, cancer, diabetes). Due to the fundamental differences between human health and environmental risks (e.g., climate change, drought, deforestation, coral reef degradation, wildfires), it may not be appropriate to apply human health-specific theories to environmental risk messaging. First, these two types of risks are different in their causes, consequences, and primary target; human health risks directly threaten the self, whereas environmental risks threaten the self as well as something or someone other than the self, for example, plants and animals, and their habitats. Second, because people perceive these two risk classes differently (e.g., Schutz & Weidmann, 1998) meaning that the predictors (i.e., health beliefs) in the models will be unique, their attitudes, intentions, and behavior regarding health and environmental risks also differ such that they generally prioritize health risk mitigation over environmental risk mitigation (Kahlor et al., 2006; Weber, 2006).

The central claim of this dissertation is that because environmental risks threaten both human and environmental health, messages about this category of risk can be framed to increase the salience of one threat target relative to the other (i.e., human health

relative to environmental health), and further, that specific message elements result in different outcomes depending on the frame being used. These claims are based on the idea that some message elements are more relevant to a health frame and others to an environmental frame, and that when there is match in relevance between the message element and the frame, message outcomes are improved as opposed to when there is irrelevance and non-matching between the message elements and the risk frame. This claim will be investigated by studying the effects of relevant and irrelevant similarity in narrative risk message.

The dissertation treats similarity into two ways; one way concerns similarity of demographics (e.g., race, age, occupation) between the audience and narrative characters, referred to as demographic similarity; the other concerns similarity of features shared between the locale of the audience and the locale of the narrative characters (e.g., geographic location, weather, infrastructure), referred to as scene similarity. Because human health risks are considered to primarily affect people, demographic similarity may be more relevant to a health message frame than to an environmental message frame. However, because environmental risks are perceived as primarily affecting the environment, scene similarity may be more relevant to an environmental message frame than to a health message frame. It is therefore hypothesized that demographic similarity is more important than scene similarity as a predictor of risk perception, narrative persuasion, and behavioral intention when the risk is framed a human health threat, whereas scene similarity is more important than demographic similarity as a predictor of the same variables when the risk is framed as an environmental threat.

To assess these claims, a 2 (risk frame: health, environmental) × 2 (demographic

similarity: high, low) × 2 (scene similarity: high low) online experiment was conducted (N = 568), after implementing two pilot studies (N = 171, and N = 426). The studies draw on narrative persuasion theory as well as theories in the broader areas of persuasion and social influence, health and risk communication, risk perception and assessment, decision-making, risk and information processing. The results have implications for risk communication in both health and environmental contexts but especially in the latter because of the duality of the target of the threat for environmental risk (i.e., they threaten both human as well as environmental health).

The next chapter situates the dissertation research in the broader context of risk communication and discusses literature regarding characteristics and perceptions of risk in general, and then more importantly, focuses on research about human health and environmental risks. The chapter also elucidates the connections between risk perception, similarity, persuasion, and attitude and behavior change, and briefly discusses some of the variables that may modify these connections. Details of the research studies conducted are found in Chapters 3 and 4; Chapter 5 lays out limitations of the research, implications, and recommendations for future studies.

Chapter 2: Human Health and Environmental Risk Perception and the use of Similarity-Based Messages to Stimulate Change

This chapter is divided into three sections. The first situates human health and environmental risks in the broader context of risk communication and then goes on to define, characterize, and operationalize each of these two types of risk. The purpose of that first section is to explain the theoretical basis for the operationalization of human health and environmental risk frames used in this dissertation and the distinction between these two frames. Being able to distinguish between the health frame and the environmental frame is fundamental to the arguments about the proposed differential roles of demographic similarity and scene similarity in each frame.

The second section elaborates on risk perception, its role in attitude and behavior change, how it differs between human health and environmental contexts, and how narratives may influence risk perception. The third section discusses the role of message framing and similarity in risk perception and narrative persuasion processes, and how the influence of demographic similarity and scene similarity may differ between a health-framed risk narrative and an environmental-framed one.

Characterizing the Risk in Risk Communication

Defining Risk Communication

The various definitions of risk communication in the literature speak to the multifaceted nature of the process of communicating risk. Plough and Krimsky (1987) defined risk communication as "any public or private communication that informs individuals about the existence, nature, form, severity, or acceptability of risks" (p. 6),

and, McComas (2006) defined it as “an iterative exchange of information among individuals, groups, and institutions related to the assessment, characterization, and management of risk” (p. 76). Covello, von Winterfeldt, and Slovic’s (1987) definition specified the type of risks in question; they stated that risk communication is "any purposeful exchange of scientific information between interested parties regarding health or environmental risks” (p. 222). Covello’s (1998) definition adds information about message content and context; he stated that risk communication is an open, transparent, systematic, structured and evidence-based method of effective communication that “involves the exchange of information among interested parties about the nature, magnitude, significance, or control of a risk” and which occurs in high-concern situations where people perceive a threat to their safety, health, or environment (p. 161).

Although some may object to definitions limiting risk communication to health and environmental contexts, much of the literature in the field is indeed related to these two contexts, particularly in the case of public health risk communication (see reviews about the development of risk communication in McComas, 2006; Plough & Krimsky, 1987). What is generally missing from the literature, however, is a comparison of how risk communication may differ between health and environmental contexts. For a clear understanding of possible differential message effects between these two contexts, clear operational definitions of health and environmental risks need to be established, a feat that can be quite complex. The following section first establishes how the term *risk* is used in this dissertation and then goes on to discuss the definition, categorization, and characterization of health and environmental risks.

Defining, Characterizing, and Categorizing Risk

Risk as a general term. Risk is commonly defined as the probability of an event with adverse consequences, and the magnitude of its effects (Kaplan & Garrick, 1981; Rayner & Cantor, 1987; Whyte & Burton, 1980). The term *hazard* is often confused with risk, but experts point out that the *event* with adverse consequences is called the hazard, whereas the *likelihood* of a hazard causing harm is called risk (Kaplan & Garrick, 1981). Nonetheless, the terms hazard and risk continue to be used interchangeably in the literature, but seemingly less out of confusion and more out of convenience (see, e.g., Kasperson, Kasperson, & Dow, 2001; Whyte & Burton, 1980). In this dissertation the term risk carries the same meaning as hazard, that is, the adverse event itself (e.g., drought, climate change). This dissertation is concerned with people's perception, that is, their subjective (perceived) risk rather than objective risk, which is the actual scientific probability that the adverse event will occur (Boholm, 1998; Kaplan & Garrick, 1981; Weber 2006).

Risks have been defined, categorized, and characterized in several ways, based on various aspects, including the severity of the risk for human casualties versus no human casualties (Fischhoff, Slovic, Lichtenstein, Read, & Combs, 1978), source of the risk, for example, natural versus manmade (e.g., Axelrod, McDaniel, & Slovic, 1999; McDaniels, Axelrod, & Slovic, 1996, 1997), the medium through which the risk is transferred, such as humans versus environment (e.g., Smith, 2013; Whyte & Burton, 1980), the scale of the impact, such as local versus global (e.g., Schmidt & Gifford, 1989), and the target of the risk outcomes, that is, self versus something or someone other than self (e.g., Dietz, Stern, & Rycroft, 1989; Kahlor et al., 2006). Definitions (implicit or explicit) of

environmental risk, however, are more likely to be based on more than one of these aspects, whereas definitions of health risk (very few of which are explicit) appear to be based solely on the target of the risk, that is, human health and wellbeing.

Defining and operationalizing human health and environmental risk. Menon, Raghubir, and Agrawal (2008, p. 2) defined health risk as "the perception of the subjective likelihood of the occurrence of a negative event related to health for a person or group of people over a specified time period." For the purpose of this dissertation, the operational definition of a human health risk is: a risk that is readily seen as directly and primarily affecting humans, with no obvious adverse effects on nonhuman elements of ecosystems. Risks that fall into this category include cancer, heart attacks, and HIV/AIDS (see Kahlor et al., 2006).

Definitions of environmental risk are based on combinations of several aspects of the risk including its severity, source, medium of transmission, scale, and target. For example, Kasperson, Kasperson, and Dow (2001, p. 4), defined an environmental risk as one that levels "threats to human beings and what they value resulting from human-induced environmental change, either systemic or cumulative, on the global scale." In this dissertation, the operational definition of an environmental risk is: a natural or human-induced hazard, transmitted through the natural or built environment, with negative consequences for human and nonhuman components of ecosystems, on a local or global scale. Nonhuman components of ecosystems include plants, animals, and their habitats. For the purpose of this dissertation ecological and environmental risks are synonymous. The dual nature of an environmental risk affecting both self and something or someone other than self makes it suitable for message framing as either a threat to

health or a threat to the environment, and as a framework for studying message features that are perceived differently for these two types of threat.

When formulating messages designed to change people's attitude and behavior through increased risk perception, a clear understanding of how people perceive the risks in the first place will help to determine how message elements can be used to alter risk perceptions. Clearly, health and environmental risks have distinctive. Next, I will elaborate on how these distinctions might manifest themselves in different risk perceptions.

Risk Perception

Defining Risk Perception

Within the realm of risk communication, it is considered axiomatic that persuasion (attitude and/or intention change) cannot occur if one does not perceive the risk. Risk perception refers to people's subjective judgments about the probability of an adverse event and their concern about the consequences (Sjöberg, 2004; Slovic, 1987). Risk perception is based on a host of psychological, social, cultural, and contextual factors, as well as attributions to the risk itself (Bronfman & Cifuentes, 2003; Plough & Krimsky, 1987; Sjöberg, 2004; Slovic, 1987). These judgments involve "beliefs, attitudes, judgments and feelings, as well as the wider cultural and social dispositions they adopt towards hazards and their benefits" (Pidgeon, Hood, Jones, Turner, & Gibson, 1992, p. 89). Risk perception is therefore a subjective concept in that two risks with the same objective probability (i.e., probabilistic risk assessments) can be perceived differently by the same person (see Slovic, 1992).

Linking Risk Perception with Attitude and Behavior

Risk perception determines people's tolerance and acceptability of risk as well as their reactions to risk (Sjöberg, 2004; Starr, 1969). Fischer et al. (1991) found that people's willingness to pay for reductions in future risks was higher for risks perceived to pose direct personal threat (e.g., human health risks) than for those perceived to directly affect something other than self (e.g., the environment). Some studies have shown that people are generally unwilling to take steps that would interfere with their personal comfort in order to mitigate perceived impersonal risk (e.g., environmental risk) but often opt to engage in smaller behaviors even when those behaviors (e.g., recycling) may have little or no effect on the problem (Lorenzoni & Pidgeon, 2006; Wakefield, Elliot, Cole, & Eyles, 2001). This raises the issue of willingness to make personal sacrifices, a concept that has been found to be critical in behavioral intentions to engage in climate change mitigation (Loewenstein, Weber, Hsee, & Welch, 2001; O'Connor et al., 2006; Roser-Renouf & Nisbet, 2008).

Loewenstein et al. (2001) suggested that the reason people are not willing to make personal sacrifices to mitigate climate change is because people do not experience the level of emotion needed to drive such behavior. Climate change and related risks rank below personal risks and everyday stresses (Bostrom, Granger Morgan, Fischhoff, & Read, 1994; Lorenzoni & Pidgeon, 2006; Norton & Leaman, 2004) with regard to their priorities. In addition, people generally consider themselves responsible for personal risks like human health risks but consider environmental risks as posing no direct personal threat, lacking in personal relevance and responsibility (Gattig & Hendrickx, 2007; Kahlor et al., 2006; Leiserowitz, 2005, 2007; Meijnders, Midden & Wilke, 2001; Taylor-

Gooby & Zinn, 2006; Weber, 2006). Because of these characteristics people perceive that they have little control over environmental risks and generally do not feel efficacious about their individual actions to mitigate this category of risk (Lorenzoni & Pidgeon, 2006).

McDaniels et al. (1995) measured perceptions of a number of environmental risks including deforestation, loss of wetlands, acid rain, marine pollution, ozone depletion, and soil erosion, finding that in terms of these risks, the participants perceived the consequences to be greater for nonhuman species than for themselves. In addition, participants perceived that environmental risks held greater benefits for society as a whole than for themselves. Harland et al. (1999) posited that this is perhaps because the benefits of behaviors related to environmental risks are less obvious than for personal risks. According to Roser-Renouf and Nisbet (2008, p. 48), "impersonal risk perceptions are powerful drivers of policy preferences and behavioral intentions." Sjöberg (2000) found that the seriousness of the consequences of a risk (an important component of risk perception) and interest in the risk predicts the demand for mitigation. People tend to place impersonal risks in the category of moral or ethical issues and often disassociate themselves from such risks (Zwick & Renn, 2002). In addition, Poortinga and Pidgeon (2003) found that in some cases the dread factor for such risks is low. Strategic messages can be used to increase people's risk perceptions with a view to changing their attitude and behavior.

Narratives provide a way to frame a risk in a health or an environmental context, while varying the features of people and places portrayed. The following section discusses some of the characteristics of narrative risk communication that may facilitate

change in risk perceptions, attitude and behavior.

Changing Risk Perception through Narratives

Narratives provide the opportunity for people to vicariously and emotionally experience the impacts of a risk by presenting the disastrous consequences in a concrete and relevant manner (De Wit, Das, & Vet, 2008; Dunlop, Wakefield, & Kashima, 2010; Marx et al., 2007; Moyer- Gusé, 2008; Weber, 2006). This vicarious experience in turn leads to increased realism and enhanced identification (Green & Brinn, 2003; Cohen, 2001) with the story line or the characters themselves, as well as with the places depicted in the story. Weber (2006, p. 103) suggested that mental simulations of risk-related consequences for places and possessions that people value can create visceral reactions needed to motivate attitude and behavior change regarding environmental risks like climate change.

Kreuter et al. (2007, p. 222) defined a narrative as "a representation of connected events and characters that has an identifiable structure, is bounded in space and time, and contains implicit or explicit messages about the topic being addressed." Compared to statistical messages, narratives can sometimes be more persuasive because they have been found to be associated with less defensive message processing (De Wit, Das, & Vet, 2008) and the persuasive intent may be considered to be less transparent than in other types of messages (Kreuter et al., 2007).

De Wit, Das, and Vet (2008) compared the persuasiveness of narrative versus statistical messages about Hepatitis B virus in increasing the risk perception of men who have sex with men. They found that participants who were exposed to the narrative messages had higher perceptions of risk and greater intentions to become vaccinated

against the virus than those who were exposed to a statistical message. De Wit et al. concluded that the narratives increased the sense of personal risk because they caused less reactance and counterarguing.

Narrative persuasion processes: Identification, transportation, and self-referencing. In addition to reducing counterarguing, narratives are said to influence attitude and behavior through a number of processes including identification, transportation, and self-referencing (Cohen, 2001; Dunlop, Wakefield, & Kashima, 2010; Green & Brock, 2000, Moyer-Gusé, 2008). Cohen (2001) described identification as a process in which audience members take on the perspective of a character to the extent that they lose their sense of self-awareness and develop intensified cognitive and emotional connections with the character, leading the audience to empathize with the character, adopt the character's identity and goals, and simulate feelings appropriate for the character in a given situation. Transportation, which is becoming engrossed (absorbed) in a story, is theorized to be different from identification although both concepts involve losing oneself in a story (Moyer-Gusé, 2008). The difference is that in the case of identification the message receiver takes on the perspective of the character(s), whereas transportation does not require this perspective-taking (see Cohen, 2011; Moyer-Gusé, 2008; Moyer-Gusé et al., 2011). Self-referencing has been defined as relating information to aspects of oneself (Burnkrant & Unnava, 1995). Dunlop et al. (2010) noted that self-referencing goes beyond personal relevance in that it provides a means through which previously stored information (e.g., memories) can be linked with information to which one is currently attending.

This dissertation proposes that contextual factors in risk communication

narratives can influence narrative persuasion processes, as well as risk perception, and behavior-related variables. Specifically, it is proposed that varying the risk-frame (health versus environmental) of the message and the level of similarity between message recipients and the people (and places) in the narrative can lead to a change in the level of the outcome variables.

Framing the narrative to improve outcomes. Nisbet (2009, p. 15) defined message frames as "interpretive storylines that set a specific train of thought in motion, communicating why an issue might be a problem, who or what might be responsible for it, and what should be done about it." Nisbet also stated that framing allows for specific information to be given greater weight over other information, and allows for linkages between two concepts. Framing an environmental risk as a health concern is a way to relate the risk to a familiar problem (personal health) thereby increasing the personal relevance of that risk (see Nisbet, 2009). Additionally, such framing can also serve to combat the distal associations often attributed to environmental risk; after all, one's personal health is as proximal as a risk can get.

Because people are likely to perceive greater threat when a risk is related to human health rather than environmental health (see Kahlor et al., 2006), it is expected that a health-framed message will lead to a greater feeling of vulnerability (susceptibility) than an environmental-framed one. Moreover, a risk that primarily affects people should be considered more severe than one that primarily affects the environment. Furthermore, people are expected to feel a greater need to take mitigating action when a risk directly affects humans as opposed to the environment, that is, they should have a higher level of behavioral intention and expectation in the case of the health frame than the

environmental frame. Additionally, they should perceive more response efficacy for a health risk (as opposed to an environmental risk) because of a greater sense of control (Lorenzoni & Pidgeon, 2006).

Framing should also influence narrative persuasion processes. Because a health risk affects people as opposed to the environment, identification (taking on the perspective of characters in the story) should be greater for the health frame than for the environmental frame. And, although transportation (losing oneself in a story) does not necessitate feeling connected to narrative characters (see Moyer-Gusé, Chung, & Jaun, 2011), at least one study (Dunlop et al., 2010) suggested that transportation involves connecting events in the story to one's life experiences; as such transportation should also be greater for the health frame as opposed to the environmental frame. Furthermore, a risk depicted in a health frame should facilitate greater self-referencing (making connections between the story and oneself).

H1: Effect of message framing on outcomes. Greater levels of susceptibility, severity, behavioral intention, behavioral expectation, response efficacy, identification, transportation and self-referencing will be seen in the case of a health-framed message as opposed to an environmental-framed one. Basil and Brown (1997, p. 393) suggested that "It is the combination of the message itself with people's perceptions of similarity of the depicted character that determines the effectiveness" (p. 393). Therefore in addition to investigating the role of message framing on outcome variables, it is important to also study how similarity (between narrative characters and the message receiver) may influence risk perception, narrative persuasion and behavior related variables. Further it is also expedient to study interactions between message framing and

similarity. The characterization of similarity in the literature often lacks precision however; the following section defines and characterizes similarity as it has been used in the literature and operationalizes its use in this dissertation. The section then goes on to discuss the process through which similarity influences risk perception and persuasion, with a special focus on similarity's influence through narrative persuasion processes.

Similarity

Defining, Characterizing and Operationalizing Similarity

The use of similarity as a persuasion strategy has been recognized for centuries. Aristotle's (1941) *Rhetoric* discussed the importance of source credibility, also known as ethos, and suggested that persuasive outcomes can be increased by using speakers with high status and high similarity to the audience as a means of increasing ethos. The type of similarity to which Aristotle referred is known as source similarity, or more specifically source-receiver similarity, and it has been the pervasive context in which similarity has been studied, even in the field of risk communication. This section operationalizes the two types of similarity being investigated, demographic and scene similarity, and discusses their relevance (suitability) to health and environmental risks. This section also explains how these two types of similarity may influence attitude and behavior change by altering risk perception and narrative persuasion processes.

Demographic similarity. According to Lowry (1973), demographic similarity refers to the degree of correspondence between the physical attributes of the sender and receiver. This definition can also be applied in the context of narrative communication as it regards similarity between story characters and audience members. Lowry referred to demographic similarity as "what the communicator is" (p. 195) and gave examples such

as gender, race, age, height, and nationality. Demographic similarity is related to character similarity, which is defined by Moyer-Gusé (2008, p. 410) as "the degree to which an individual perceives that he or she is similar to a character." Cohen (2001) pointed out that this perceived similarity increases realism and is not limited to demographic similarity but can extend to similarity of feelings and situations. However, the type of character similarity with which this dissertation is concerned is confined to demographic similarity between the characters in a narrative and the audience.

Cohen (2001) noted that audience members can respond to a character in a narrative in several ways, including perceiving themselves as similar to that character, a response that has been shown to precede identification (Kreuter et al., 2007; Moyer-Gusé, 2008). Character similarity is widely discussed in the entertainment-education literature and is one of five dimensions of involvement audience members can have with characters in a narrative. The five dimensions are: similarity, liking, identification, wishful identification, and parasocial interaction (Cohen, 2001; Moyer-Gusé, 2008).[1] Character similarity is said to be the driving mechanism responsible for stronger character involvement (McKinley, 2010).

Scene similarity. The types of similarity found in the literature appear to capture the similarity of people well, but have little to do with the similarity of places, that is, the scene in which a story takes place. Scene similarity can, however, be considered in the broader realm of situational and contextual similarity that have been mentioned by some researchers (e.g., Cohen, 2001; Howel, Moffatt, Bush, Dunn, & Prince; Lorenzoni et al., 2006). According to Lowry (1973), situational similarity refers to the degree of correspondence between some shared past or present or experience. According to Belk

(1975), "situation" can be broadly defined as a "behavioral setting" bounded by space and time. A related concept more applicable to this dissertation is "environment," which can be considered as a "permanent situation" and includes the geographic location of a space (Belk, 1975). If similarity is to be used in messages about environmental risks, often perceived as a threat to something or someone other than self (see Kahlor et al., 2006; Leiserowitz, 2005, 2007), the similarity of the "something other than self" (e.g., the environment) must also be captured in the message. For a discussion about the importance of using a people *and* places framework when attempting to change risk related attitude and behavior see Maibach, Roser-Renouf, and Leiserowitz (2008).

For the purpose of this dissertation, scene refers to the physical environment in which a story is set, and includes the geographical location, the weather and climate, and natural and human-made elements of the physical environment (e.g., vegetation, infrastructure). By extension, scene similarity is defined as the similarity between the physical environment depicted in a message and the physical environment of places valued by the audience, for example their residential locale, and it includes aspects of both the built and the natural environment.

Using Similarity to Improve Outcomes

Similarity, risk perception, and behavior. Similarity (particularly source-receiver similarity) has been widely used as a means of gaining compliance and changing attitude and behavior regarding health risks (Basil & Brown, 1994, 2004; Kalichman, & Hunter, 1992). Several studies have found that similarity increases risk perception. For example, Brown, Messman-Moore, Miller and Stasser (2005) determined that the greater the perceived similarity between study participants and victims of sexual assault, the

greater their perceived risk of becoming victims of such assaults. Grace, Hershenfield, Robertson, and Stewart (2004) revealed that people who knew a similar other with severe acute respiratory syndrome (SARS) perceived themselves to be at greater risk.

Silvia (2005) found that high levels of source-receiver similarity led to increased compliance regardless of the level of threat in the message. Additionally, after the announcement by sport celebrity Earvin "Magic" Johnson about his HIV status, significant changes in behavior were reported by high-risk individuals who identified with Johnson because of similarity (Kalichman, & Hunter, 1992; Wåhlberg & Sjöberg, 2000).

The positive relationship between similarity and risk perception is not always seen however, particularly in the optimistic bias literature. Optimistic bias is the tendency to perceive one's risk as lower than that of others (Weinstein, 1980). Optimistic bias therefore is comparative risk perception, that is, the difference between people's perception of risk to themselves and their perception of risk to others. Research shows that optimistic bias increases as dissimilarity between self and a referent other increases (Menon, Block, & Ramanathan, 2002; Perloff & Fetzer, 1986; Rimal & Morrison, 2006; Weinstein, 1980). Weinstein (1980) noted that this optimistic bias is a function of stereotype salience, that is, people have a stereotype regarding whom an event is likely to affect, and the more different from the stereotype they perceive themselves to be, the greater their optimistic bias. It is evident in the literature that people do not generally perceive themselves or similar referent others to be vulnerable to risks (Raghubir & Menon, 1998; Rimal & Morrison, 2006; Weinstein, 1980).

Research on comparative risk judgments indicates that people judge their risks to be on the same level as the risks of similar others (Davis, Hoch, & Ragsdale, 1986; Menon, Raghubir, & Schwarz, 1995; Whitley & Hern, 1991). Rimal and Morrison (2006) found that individuals perceived themselves to be more susceptible to a risk that similar others were susceptible to, as opposed to a risk to which dissimilar others were vulnerable. In other words, optimistic bias was virtually eliminated when demographic characteristics (e.g., gender, age, ethnicity) between study participants and referents were matched. However, this absence of optimistic bias is cause for concern because people tend to perceive the magnitude and consequences of the risk to be low for themselves as well as similar referent other. In other words they perceive both themselves and similar referents to be invulnerable to the risk (Menon, Block, & Ramanathan, 2002; Perloff & Fetzer, 1986; Raghubir & Menon, 1998; Rimal & Morrison, 2006; Weinstein, 1980).

Optimistic bias has been observed with environmental risks, in that people perceive these risks as a threat to dissimilar, rather than similar others, and to dissimilar rather than similar places in their residential frame of reference (Leiserowitz, 2005, 2006, 2007; Lorenzoni et al., 2006, 2007). With the recognition that people do not readily perceive risks to themselves or places they value (Lorenzoni et al., 2006; Weber, 2006; Weinstein, 1980), a possible way of increasing their risk perception is by increasing their perception of risks to similar others and similar places of reference. Because people judge their risk on the same level as the risks to similar others (Rimal & Morrison, 2006), this should increase their perception of increased risk to themselves and to the places where they live or value.

Risk-Relevant Similarity. Because studies investigating the effects of similarity on risk perception and persuasion have dealt overwhelmingly with personal risk, there is need for research regarding the role of similarity in the perception of risks that are considered to be impersonal, for example, environmental risks. Not only is it worthwhile to determine whether the influence of similarity differs according to the type of similarity in the message (hypothesis 2) but it would also be beneficial to determine whether the influence of a specific type of similarity varies depending on the way the message is framed. An interesting question, for example, is whether a specific type of similarity is more relevant (suitable) for a particular message frame.

Simons et al. (1970) suggested that relevant similarity has a greater effect on persuasion when compared with the effect of irrelevant similarity on persuasion. This relevance does not refer to personal relevance, but instead to the appropriateness of using a particular type of similarity in messages about particular types of risk. For example, this dissertation contends that because environmental risks affect both people and places, when people cognitively make connections between themselves and the message content (self referencing), they are making these connections both in terms of the people in the message, and contextual factors such as place. Consequently it may be more appropriate to use in environmental risk messages, depictions of both similar people (demographic similarity) and similar places (scene similarity) as a frame of reference for message receivers.

Based on the idea of using message-relevant similarity (vs. irrelevant similarity) it is expected that for narratives highlighting a personal risk (e.g., a human health risk), similarity of demographic elements will be more relevant (appropriate) than similarity of

scenic or other contextual elements because a personal risk primarily affects the self. In other words, demographic elements paired with a risk affecting personal health make a relevant match.

Consequently, demographic similarity should have a greater influence on risk perception, attitude and behavior when a risk is framed as a health risk as opposed to when it is framed as an environmental risk. Alternately, for narratives highlighting perceived impersonal risks such as environmental risks (e.g., climate change, coral bleaching, deforestation, land and sea pollution), similarity of scenic elements (scene similarity) is expected to be more relevant (appropriate) than similarity of demographic elements because even though these risks affect people, they often do so indirectly, but they affect the environment directly.

Bickerstaff and Walker (2001) stated that when it comes to global environmental risks, perception is intimately tied to aspects of local context. In their study on risk perceptions regarding air pollution, concern about the threat was influenced by the local setting and lived experience. However, some researchers have found that people may not perceive similarities between their geographical locations and the stereotypical geographical locations shown by the media as being affected by environmental risks such as climate change (Leiserowitz, 2005, 2007; Lorenzoni et al., 2006). Lorenzoni et al.'s (2006) paper posited that localized representations of climate change effects may increase salience and engender mitigating behavior. This may also be the case for climate change related risks such as droughts, heatwaves, storms, and floods.

Similarity's influence through narrative persuasion processes. The influence of similarity on risk perception, attitude, and behavior is proposed to occur through self-

referencing, identification, and transportation. Perceived similarity has been found to indirectly affect attitude and behavior change through identification (see Bandura, 1986; Basil & Brown, 1996, 1997; Cohen, 2001; McKinley, 2010; Moyer- Gusé, 2008). Identification can be triggered by message features or a realization of the similarity that exists between the audience and the character (Cohen, 2001).

Moyer- Gusé's (2008) entertainment overcoming resistance model (EORM) proposes that identification leads to attitude and behavior change by reducing counterarguing and selective avoidance, by increasing perceived vulnerability, and by changing outcome expectancies, which refer to perceived consequences of a given behavior (Cohen, 2001, Kreuter et al., 2007; Moyer- Gusé, 2008). Subsequent tests of the EORM have found overall support for the EORM (e.g., McKinley, 2010; Moyer- Gusé, Chung, & Jain, 2011; Moyer- Gusé & Nabi, 2010). However, whether there is a relationship between identification and perceived vulnerability is inconclusive at best: Neither Moyer- Gusé et al. (2011), Moyer- Gusé and Nabi (2010) nor McKinley (2010) found a statistically significant relationship between the constructs (although Moyer-Gusé and Nabi's data showed a relationship between identification and vulnerability nearing statistical significance, but, only after a two week delay). The lack of statistical significance for the influence of identification on perceived vulnerability could be due to the lack of personal relevance, which, as previously mentioned is critical in risk perceptions (Markova & Power, 1992).

Dunlop et al. (2010) found that for participants who read a narrative on skin cancer risk, transportation increased behavioral intention through self-referencing, which has been defined as relating information to aspects of oneself (Burnkrant & Unnava,

1995). Dunlop et al. stated that this finding suggested that transportation also involves relating events in a narrative to one's own experiences. It is therefore reasonable to predict that the more similarity found between a narrative and oneself, the greater the level of transportation. Moreover, such a link between similarity and transportation is also easy to envision when one considers the conceptual overlap between transportation and identification, particularly as similarity is considered a prerequisite for the latter. Self-referencing has been found to behavioral intention through felt risk, that is, affect related to judgments of personal risk (Dunlop et al., 2010). Because self-referencing involves relating elements in a story to oneself and one's experiences, it is also expected to increase with similarity.

H2: Effect of similarity on outcomes. There will be greater levels of susceptibility, severity, behavioral intention, behavioral expectation, identification, transportation, and self-referencing when demographic similarity and scene similarity are high rather than low.

H3a: Risk frame × demographic similarity interaction on outcomes. A risk-frame × demographic similarity interaction will occur for susceptibility, severity, behavioral intention, behavioral expectation, identification, transportation, and self-referencing, such that when demographic similarity is increased from low to high, there will be an increase in the level of the dependent variable, but the increase will be greater when the risk is framed as a health risk than when it is framed as an environmental risk. The highest scores on these dependent variables are expected for the health frame when demographic similarity is high, and the lowest scores for the environmental frame when demographic similarity is low.

H3b: Risk frame × scene similarity interaction on outcomes. A risk frame × scene similarity interaction will occur for susceptibility, severity, behavioral intention, behavioral expectation, identification, transportation, and self-referencing, such that when scene similarity is increased from low to high, there will be an increase in the level of the said outcome variables, but the increase should be greater when the risk is framed as an environmental risk than when it is framed as a health risk. The highest level of each outcome variable is expected to occur when the frame is environmental and scene similarity is high, and the lowest for the health frame when scene similarity is low.

H4: Risk frame × demographic similarity × scene similarity interaction on outcomes. A three-way interaction is predicted for susceptibility, severity, behavioral intention, behavioral expectation, identification, transportation, and self-referencing, such that demographic similarity should have a greater effect on dependent variables when the risk was framed a health threat (rather than an environmental threat), and scene similarity should have a greater effect on the same variables when the risk was framed as an environmental threat. Additionally, for both message frames, the highest level of each dependent variable is expected to occur when both types of similarity are high rather than low, but the highest increase should be seen for the health frame when both demographic and scene similarity are high, followed by the environmental frame with both types of similarity are high. The lowest level of each dependent variable is expected to occur for the environmental frame—low demographic

similarity—low scene similarity condition, followed by the health frame—low demographic similarity—low scene similarity condition.

RQ1: Demographic similarity × scene similarity on outcomes. Is there a significant demographic similarity × scene similarity interaction for any of the outcome variables, without the effect of framing?

RQ2: Effect of independent variables on perceived demographic and scene similarity. How do risk frame and manipulated similarity influence perceived demographic and scene similarity in terms of individual effects and interactions? Particularly, does an increase in one type of similarity lead to an increase in the perception of the other type of similarity, with and without the effect of risk frame? For example, do people think that they share more demographic characteristics with story characters if their locale is similar to that of the characters, and do these perceptions depend on the risk frame?

The Role of Personal Relevance in Risk Perception and Narrative Persuasion

Personal relevance has been found to be a predictor of risk perception and persuasion. Several researchers have highlighted the need for increasing the personal relevance and salience of impersonal risk as a way of engendering mitigating action (e.g., Kahlor et al., 2006; Leiserowitz, 2005, 2006, 2007; Lorenzoni et al., 2006, 2007; Weber, 2006). Maximizing the similarity in messages about perceived impersonal risk may be one way of increasing the personal relevance and salience of this type of risk.

In the Elaboration Likelihood Model (ELM, Petty & Cacioppo, 1986), personal relevance is operationalized as issue involvement. Issue involvement is defined as, "the extent to which the attitudinal issue under consideration is of personal importance" (Petty

& Cacioppo, 1979, p. 1915). As stated in Petty and Cacioppo (1990), personal importance encompasses various aspects of relevance, including goals and values. According to the Elaboration Likelihood Model (ELM), there are two routes to persuasion: the central route leads to persuasion through careful elaboration and evaluation of the arguments in a message, whereas persuasion through the peripheral route is achieved by using heuristic cues unrelated to the arguments in the message. The message processing route depends on motivation and ability, with high motivation and ability leading to central route processing, and low motivation and ability leading to peripheral processing.

Personal relevance (issue involvement) represents a form of motivation, therefore the greater the personal relevance, the greater the motivation, and the more likely that the central route to persuasion would be taken, therefore the greater elaboration of arguments in the message. Likewise, lower levels of personal relevance leads to lower levels of motivation making it more likely that the peripheral processing route will be taken, and hence less attention to message arguments, and more attention to heuristic message cues (Petty & Cacioppo, 1981). It therefore stands to reason that the degree to which participants are influenced by depictions of similarity (the representativeness heuristic, see Tversky & Kahneman, 1974) in a risk message would depend on the personal relevance of the issue in the message. Participants for whom the issue has high personal relevance should be less influenced by the similarity (representativeness) heuristic than participants for whom the issue is of low personal relevance. This is because according to the ELM, participants for whom the issue is of low personal relevance are likely to focus less on message arguments, and more on heuristic cues in the message. Because a strong

influence of personal relevance is expected, its effect would be controlled for using analysis of covariance. Details of the influence of personal relevance are reported in a section called “supplemental analyses” found toward the end of Chapter 4.

Chapter 3: Method

Three studies were conducted for this dissertation: two pilot studies and one main study. This section describes the participants, procedures, and instruments of all three studies, as well as the results of the two pilot studies. Results of the main study are reported in Chapter 4.

Pilot Study 1

Purpose of Pilot Study 1

The purpose of the first pilot study was to choose two risks that would be the focus of the main study messages. The main study required that judgments about a health risk (i.e., one primarily threatening self [personal]) be compared with judgments about an environmental risk (i.e., one threatening something other than self [impersonal]) as a test of the hypothesis that people process messages about health risks differently from the way in which they process environmental risks. Pilot 1 consisted of an original list of eight risks from which two were chosen for the main study. The original list of eight were climate change, drought, flood, global warming, heat wave, high pollen count, tornado, and West Nile Virus, which in turn were chosen from a host of risks thought to be intensifying because of climate change and global warming (see Greenough, McGeehin, Bernard, Trtanj, Riad, & Engelberg, 2001; Patz, Engelberg, & Last, 2000); which are also considered risks and therefore included in the Pilot 1 study. Climate change and global warming were used as a broad framework for the Pilot Study 1 risks because they affect an array of risks that may be judged differently, and which have the potential to adversely affect both self and something other than self.

It was hoped that the differential risk judgments garnered from Pilot Study 1 (see Appendix E) would collectively provide some insight into why people may perceive one risk as personal and another as impersonal, in other words, they would help to elucidate the underlying dimensions on which people judge health and environmental risks. More specifically then, the main objective of Pilot Study 1 was to find one risk that fell on the personal end of the perceptual continuum (basically a health risk) and one that fell on the impersonal end of the continuum, that is, a risk affecting something other than self, and in this case an environmental risk. Keep in mind that one of the main arguments of this dissertation is that the use of demographic similarity and scene similarity yield different effects between perceptions of health and environmental risks because of their differences. However although the dissertation theorized that these differences result from perceptions of threat to self (personal) versus threat to other (impersonal), conclusive statistical evidence in the literature to support this view has not been obvious.

RQ1 – Pilot 1: Is there an interpretable simple structure that indicates the underlying dimensions upon which risks are perceived in terms of susceptibility and severity, and other characteristics such as scale of effects, immediacy, abstractness, primary target of the threat, personal relevance, need for personal action, and collective efficacy?

RQ2 – Pilot 1: Is there a significant difference between people's perceptions of risks based on the characteristics in RQ1 (i.e., susceptibility, severity, scale of effects, immediacy, abstractness, primary target of the threat, personal relevance, need for personal action, and collective efficacy)?

Additionally, it was determined that each risk chosen for the main study should fit the description of one that people thought was severe, but at the same time one to which they were not susceptible. It was felt that it would be easier to see the persuasive effects of similarity in the main study messages if there were room for persuasion rather than if people people's attitudes toward the risks were already favorable (i.e., if they felt the risk was severe and that they were also susceptible).

RQ3: Which health risk and which environmental risk do people perceive to be most severe, but at the same time to which they perceive themselves to be the least susceptible?

Participants for Pilot Study 1

A survey was given to 171 undergraduates between 18 and 29 years old taking the basic communication course at a large public university in the Southern region of the United States. There were 40 males and 130 females; one person did not indicate his or her gender. The students represented the full gamut of majors at the university because the course falls in the general education category.

Procedures for Pilot Study 1

The Pilot Study 1 survey (see Appendix E) asked participants to state the extent to which they agreed or disagreed with statements about the eight aforementioned risks (climate change, drought, flood, global warming, heat wave, high pollen count, tornado, and West Nile Virus), on a scale of zero to 100, where zero signified complete disagreement and 100 signified complete agreement. The questions about perceived susceptibility and severity were based on the Risk Behavior Diagnostic Tool (Witte,

McKeon, Cameron, & Berkowitz, 1995); other questions were based on risk-related characteristics such as immediacy and extent of negative consequences from Slovic's (1987) dread and unknown risk dimensions, and still others on notions of abstractness, target of the impact, and scale of negative effects that have been used in the literature to describe environmental risks. Together, responses to the questions were intended to provide a general overview of risk perceptions in the study population, about the selected climate change related risks.

Measured Variables for Pilot Study 1

Susceptibility. Susceptibility was measured using the susceptibility subscale of the Risk Behavior Diagnostic Scale (RBD; Witte, McKeon, Cameron, & Berkowitz, 1995), and one additional item added by the researcher. The RBD items were: (1) it is likely that I will be affected by ___, (2) I am at risk for being affected by ___, and (3) It is possible that I will be affected by___. The additional item was: (4) The extent to which I will be affected by ___ is great. Each question was answered for all eight risks on a scale of 0 to 100 where 0 = strongly disagree, and 100 = strongly agree. Internal consistency of the scale was measured for each risk as well as for all risks collectively using Cronbach's Alpha. Reliabilities are reported in Table 1.

Severity. Severity was measured using the severity subscale of the Risk Behavior Diagnostic Scale (Witte, McKeon, Cameron, & Berkowitz, 1995) and consisted of three items: (1) I believe that ___ is severe, (2) I believe that ___ has serious negative consequences (the term "negative consequences" was added to improve specificity, and (3) I believe that ___ is extremely harmful. Each question was answered for all eight risks on a scale of 0 to 100 where 0 = strongly disagree, and 100 = strongly agree.

Internal consistency of the scale was measured for each risk as well as for all of the risks collectively using Cronbach's Alpha; individual risk reliabilities were between .763 and .871. Reliabilities are reported in Table 1.

Table 1

Reliabilities for Pilot Study 1 Severity and Susceptibility Scales

Risk	Severity Cronbach's Alpha *(4 items)*	Susceptibility Cronbach's Alpha *(4 items)*
Climate change	.865	.899
Drought	.766	.842
Flood	.763	.823
Global warming	.866	.913
Heat wave	.822	.861
High pollen count	.871	.900
Tornado	.773	.858
West Nile Virus	.851	.852

General risk questions. The additional measures in the Pilot Study 1 survey were single items largely based on Slovic's (1987) dread and unknown dimensions of risk perception, and Leiserowitz's (2005, 2007) survey of American risk perceptions of climate change and global warming. The items measured perceptions of the extent (level) of the potential effects of the risks (The effects of ___ occur on a large scale), the perceived extent of personal impact (The extent to which I will be affected by ___ is great), perceived immediacy (I believe that the consequences of ___ are immediate), perceived need for personal action (There are steps that I should personally take to combat the effects of ___), perceived abstractness (___ exists in a very abstract way in my mind), degree of otherness as it relates to possible impact on other people (___ primarily affects people in other countries), degree of otherness as it relates to possible

impact on the environment relative to impact on humans (___ affects the natural environment more than it affects people), personal relevance (I consider ___ to be personally relevant), perceived efficacy of collective action (I think that humans can work together to prevent ___). Each question was answered for all eight risks on a scale of 0 to 100 where 0 = strongly disagree, and 100 = strongly agree.

Results of Pilot Study 1

Before any data analyses were performed, the Pilot Study 1 data were screened for missing and implausible values, and for outliers. Of the 174 participants who clicked on the study link, three did not consent and exited the study, leaving 171. Of these remaining cases, there were two implausible values (over the 100 maximum on the zero to 100 scale) for two of the variables, and these were removed and replaced with the group mean. Although mean substitution is often discouraged, Tabachnick and Fidell (2013) suggested that it can be used when there is a *very* small proportion of missing values, in this case only 1.2% of all values.

Prior to performing data analyses to answer the three research questions, basic general linear model assumptions of normality, linearity, and homogeneity of variance were checked. Normality was checked using skewness and kurtosis (see Appendix A) as well as through graphical methods. Values of skewness and kurtosis that approach zero indicate approximately normal distributions. Skewness refers to the distribution symmetry. There are different rules of thumb concerning skewness; this dissertation subscribes to Bulmer's (1965) rule of thumb by considering a highly skewed distribution as one that has a skewness statistic smaller than -1 or bigger than 1, a moderately skewed distribution as one that falls within -1 and -.5, and within .5 and 1, with approximately

symmetric distributions falling between -.5 and .5. Kurtosis refers to the peakedness of the distribution curve, and is related to the variance (Tabachnick & Fidell, 2013). Citing Waternaux (1976), Tabachnick and Fidell (2013) stated that underestimates in variance due to nonnormal kurtosis tend to disappear with larger samples (100 or more for positive kurtosis and 200 or more for negative kurtosis).

Of the 120 variables analyzed in Pilot 1, the vast majority (85%) were either moderately skewed or approximately normal, and 15.8 % had a skewness statistic between 1.13 and 2.11; about three of the variables (2.5%) had a skewness statistic just barely over 1.00 (between 1.08 and 1.10). According to Tabachnick and Fidell (2013), skewness and kurtosis can degrade analysis of the data and therefore highly skewed variables should be transformed unless there is a compelling reason not to. Additionally, Fink (2009) stated that transformation aids in the discovery of the correct functional form between variables. The highly skewed variables (with skewness statistic over 1.00) were transformed using log10 transformations (with an added constant of 101 for variables with high negative skewness) but in about half of those cases although the skewness statistic improved (i.e., fell below 1.00), the kurtosis statistic increased substantially. For example, in the case of PS_Tornado (which asked about whether personal steps could be taken to mitigate the effects of the risk of a tornado), the skewness statistic decreased from 1.134 to .061 but the kurtosis statistic increased from .019 to -1.727. The decision to use a log10 transformation was based on Tacbachnik and Fidell (2013). Other transformations (for example square root) did not improve the skewness or kurtosis statistic.

As Tacbachnik and Fidell (2013) noted, it is impractical to assess linearity for all

pairs when there are many variables (Pilot Study 1 had over 120) and therefore based on their suggestion, linearity was assessed by looking at bivariate scatterplots of the highly skewed variables (i.e., skewness statistic over 1.00); the scatterplots did not indicate any major variations from linearity. Homoscedasticity (called homogeneity of variance for grouped data) refers to equality of variances across dependent variables and is related to normality; variables that are approximately normal are likely to be homoscedastic (Tacbachnick & Fidell, 2013). Homogeneity of variance is often assessed during (as opposed to before) certain data analyses, for example the sphericity assumption, a version of homogeneity of variance specific to repeated measures analysis of variance (ANOVA) is reported subsequently when the results of Pilot Study 1 are discussed.

Factor analysis was used to answer the first research question (RQ1 for Pilot 1), which sought to investigate the underlying dimensions of risk perception. The extraction method was principal axis factoring (PAF) as opposed to principal components analysis (PCA) because of the interest in looking only at the shared variance among the variables, as opposed to including unique and error variance, both of which are also extracted in a PCA (see Tabachnick & Fidell, 2013). Additionally, oblique rotation was chosen because the factors being sought were not expected to be orthogonal. Apart from the general linear assumptions, factor analysis has the added requirements that the data be free from outliers, multicollinearity and singularity (redundancy associated with highly correlated variables), and that the correlation matrix of the scale items be factorable. Outliers had been removed in the screening process, and according to Tabachnick and Fidell (2013, p. 89) multicollinearity and singularity is less of a problem in repeated measures ANOVA and factor analysis used to determine underlying structure, both of which were used in

the analysis of Pilot Study 1 data.

According to Tabachnick and Fidell (2013, p. 619), the factorability of the correlation matrix (of scale items) can be assessed in various ways including checking to see whether the matrix has "several sizeable correlations." Appendix B shows the correlation matrices for the susceptibility and severity respectively, which indicate a large number of correlations above the recommended .30 (see Tabachnick & Fidell, 2013, p. 619). A statistically significant Bartlett's Test of Sphericity and a Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) above .6 also indicate that the correlation matrix is factorable (Pallant, 2010), although the Bartlett's test is said to be heavily dependent on sample size such that significance is achieved with large samples even when the correlations in the matrix are small (see Tabachnick & Fidell, 2013, p. 619). For the Pilot Study 1 dataset, all correlation matrices had a KMO of over .7, and the Bartlett's test in each case had a significance of $p < .001$, indicating factorability of the data.

The first research question (RQ1) sought to investigate the underlying dimensions upon which people judge risks in terms of susceptibility, severity, and a number of other characteristics including primary target of the threat and personal relevance. The factor analysis of the susceptibility and severity scales, and of the other items in the Pilot Study 1 questionnaire showed that people's risk perceptions were consistently based on two dimensions (eigenvalues over 1.00), one on which climate change and global warming had relatively high loadings, with the other six risks having relatively high loadings on the other dimension (see Appendix C for factor loadings). These dimensions were, however, not easily interpreted, and neither were the dimensions that emerged when all of the items (for individual risks and collectively) were entered into the analysis at once.

The other two research questions were answered by conducting repeated measured ANOVA. For repeated measures ANOVA, instead of assuming homogeneity of variance between groups, the assumption becomes homogeneity of variance between pairs of groups; this characteristic is referred to as sphericity and the assumption is that the population difference scores variance for any two groups are the same as that for any other two groups (Pallant, 2010). The assumption of sphericity can be tested using the Mauchly's test; however, this assumption is often violated, making the *F* test inaccurate (Field, 2012). The Mauchly's test is a chi-square test and a chi-square statistic with a significance of $p \leq .05$ indicates that the sphericity assumption has been violated. In such cases however (i.e., when sphericity is violated), the degrees of freedom can be corrected such that the *F* test is accurate. This correction results in a more conservative *p* value. The SPSS output gives two possible corrections, Greenhouse-Geisser and Huynh-Feldt. Field suggested that the Greenhouse-Geisser correction should be used when epsilon (ϵ) (the sphericity estimate) is less than 0.75, and that the Huynh-Feldt correction should be used when ϵ is more than 0.75.

The second research question (RQ2) sought to determine whether there was there a significant difference between people's perceptions of risks based on various characteristics of interest including susceptibility, severity, scale of effects, immediacy, abstractness, primary target of the threat, personal relevance, need for personal action, and collective efficacy. And the third research question asked which health risk and which environmental risk are perceived to be most severe, but at the same time to which they perceive themselves to be the least susceptible.

Severity. On average, participants deemed global warming (*M* = 73.81, *SD* = 19.15) to be the most severe risk closely followed by tornado (*M* =73.33, *SD* =20.89), then flood (*M* = 70.19, *SD* = 19.15), and then drought (*M* = 69.64, *SD* = 19.80). High pollen count (*M* = 43.49, *SD* = 23.79) was judged to be the least severe of the risks, followed by heat wave (*M* = 61.33, *SD* = 21.23), and then climate change *(M* = 65.25, *SD* = 24.40), which was deemed less severe than West Nile Virus (*M* =67.32, *SD* =24.04), see Table 2.

Table 2

Means and Standard Deviations for Pilot Study 1

Variable (Abbreviation)	Question	Risk Mean *[SE](SD)* N = 171 (unless otherwise stated)							
		Climate Change	Drought	Flood	Global Warming	Heat Wave	High Pollen Count	Tornado	West Nile Virus
Severity (SEV)	I believe that ___ is severe.	63.18 [1.996] (25.883)	61.63 [2.048] (26.776)	61.47 [2.008] (26.252)	70.64 [1.835] (24.002)	55.51 [1.831] (23.945)	41.91 [1.996] (26.095)	65.80 [2.125] (27.788)	58.76 [2.265] (29.615)
Serious negative consequences(SNC)	I believe that ___ has serious negative consequences.	70.04 [2.177] (28.470)	75.56 [1.820] (23.802)	75.90 [1.789] (23.396)	77.84 [1.932] (25.261)	64.77 [1.975] (25.823)	46.78 [2.125] (27.785)	77.13 [1.795] (23.476)	71.22 [2.057] (26.903)
Extreme harm (EH)	I believe that ___ is extremely harmful.	62.71 [2.181] (28.430)	71.73 [1.784] (23.325)	73.19 [1.650] (21.581)	72.94 [1.929] (25.224)	63.72 [1.921] (25.127)	41.77 [2.008] (26.258)	77.06 [1.734] (22.671)	71.98 [1.877] (24.549)
Large scale (LS)	The effects of ___ occur on a large scale.	77.50 [1.946] (25.300)	60.15 [1.953] (25.470)	55.86 [2.018] (26.310)	82.92 [1.731] (22.575)	56.10 [1.884] (24.564)	43.05 [1.982] (25.848)	52.01 [2.164] (28.209)	53.98 [2.168] (28.261)
Likelihood of being affected (LA)	It is likely that I will be affected by ___.	68.08 [2.397] (31.338)	37.08 [2.108] (27.566)	38.92 [1.921] (25.117)	70.49 [2.408] (31.493)	54.96 [2.249] (29.405)	52.02 [2.533] (33.124)	39.84 [2.149] (28.107)	25.49 [2.020] (26.413)

Variable (Abbreviation)	Question	Risk Mean *[SE](SD)* N = 171 (unless otherwise stated)							
		Climate Change	Drought	Flood	Global Warming	Heat Wave	High Pollen Count	Tornado	West Nile Virus
Risk of being affected (RA)	I am at risk for being affected by ___.	68.06 [2.483] (32.469)	40.75 [2.197] (28.727)	41.89 [2.115] (27.660)	72.07 [2.310] (30.208)	53.09 [2.311] (30.226)	48.93 [2.563] (33.518)	38.71 [2.252] (29.444)	26.38 [2.096] (27.408)
Possibility of being affected (PA)	It is possible that I will be affected by ___.	73.96 [2.335] (30.530)	55.02 [2.558] (33.447)	55.15 [2.406] (31.458)	77.44 [2.178] (28.482)	62.36 [2.410] (31.520)	60.22 [2.711] (35.453)	53.19 [2.552] (33.368)	37.56 [2.537] (33.177)
Extent to which affected (EA)	The extent to which I will be affected by ___ is great.	56.70 [2.369] (30.978)	37.78 [2.090] (27.327)	39.82 [1.877] (24.544)	64.28 [2.296] (30.022)	46.04 [2.091] (27.348)	41.16 [2.392] (31.274)	39.76 [2.189] (28.628)	31.14 [2.266] (29.628)
Consequences immediate (CI)	I believe that the consequences of ___ are immediate.	38.70 [2.446] (31.989)	54.74 [2.400] (31.380)	73.49 [2.325] (30.399)	39.01 [2.427] (31.740)	63.18 [2.412] (31.539)	53.78 [2.562] (33.497)	78.99 [2.312] (30.238)	64.80 [6.046] (79.060)
Personal steps (PS)	There are steps that I should personally take to combat the effects of ___.	53.05 [2.892] (37.706)	28.09 [2.345] (30.569)	25.59 [2.250] (29.337)	66.54 [2.678] (34.918)	26.19 [2.313] (30.155)	24.94 [2.357] (30.737)	23.87 [2.348] (30.619)	30.99 [2.583] (33.673)
Abstractness (AB)	___ exists I a very abstract way in my mind.	42.90 [2.757] (36.051)	34.11 [2.666] (34.861)	30.18 [2.560] (33.472)	47.27 [2.829] (36.993)	30.96 [2.518] (32.933)	35.27 [2.795] (36.544)	29.06 [2.386] (31.206)	40.95 [2.779] (36.341)

Variable (Abbreviation)	Question	Risk Mean *[SE](SD)* N = 171 (unless otherwise stated)							
		Climate Change	Drought	Flood	Global Warming	Heat Wave	High Pollen Count	Tornado	West Nile Virus
People in other countries	___ primarily affects people in other countries.	37.94 [2.746]	64.87 [2.413]	55.71 [2.567]	36.17 [2.781]	56.12 [2.511]	34.69 [2.431]	34.93 [2.547]	72.45 [2.375]
(POC)		(35.804)	(31.462)	(33.471)	(36.255)	(32.734)	(31.702)	(33.210)	(30.969)
Environment more than people	___ affects the natural environment more than it affects people.	72.45 [2.375]	44.36 [2.304]	41.65 [2.379]	56.74 [2.574]	40.08 [2.300]	32.75 [2.314]	40.19 [2.428]	19.76 [2.050]
(EMP)		(30.969)	(30.132)	(31.116)	(33.656)	(30.083)	(30.255)	(31.754)	(26.806)
Personal relevance (PR)	I consider ___ to be personally relevant.	55.75 [2.857]	33.96 [2.526]	35.36 [2.512]	62.15 [2.768]	40.08 [2.588]	41.06 [2.787]	33.84 [2.518]	23.81 [2.316]
		(37.257)	(32.933)	(32.758)	(36.085)	(33.738)	(36.333)	(32.826)	(30.195)
Collective efficacy (CE)	I think that humans can work together to prevent ___.	63.80 [2.822]	35.37 [2.613]	26.74 [2.280]	78.06 [2.125]	24.29 [2.228]	22.30 [2.221]	14.50 [1.894]	43.29 [2.822]
		(36.909)	(34.174)	(29.814)	(27.784)	(29.139)	(29.041)	(24.767)	(36.901)

The repeated measured ANOVA indicated that there was a significant difference in the perceptions of severity among the different risks. The assumption of sphericity was violated as indicated by the Mauchly's test, χ^2 (27, N = 171) = 318.21, p < .001 so the Greenhouse-Geisser correction was used and this indicated that there was a significant difference in perceptions of severity among the different risks, F(4.36, 736.178) = 55.69, p < .001, partial η^2 = .25 (refer to Table 3). Using Cohen (1988) as a reference, the effect size would be considered large. Pairwise comparisons showed significant differences between various pairs of risks, but most notably between high pollen count and all the other risks, between heat wave and all other risks except climate change and West Nile Virus, where p < .001 in all of those cases. Areas of no significance are also important to note; for example, the perceived severity of climate change was only significantly different from the perceived severity of global warming (p < .001) and tornado (p < .05), and there was no significant difference between the perceived severity of tornado, drought, flood, and global warming as all of these risks had comparably high severity ratings (see to Table 3).

Susceptibility. Overall, the means for susceptibility were quite lower than those for severity, except in the case of global warming and climate change. Participants perceived themselves to be most susceptible to global warming (M = 71.07, SD = 26.78) and then to climate change (M = 66.70, SD = 27.47), followed by heat wave (M = 54.11, SD = 24.91) and high pollen count (M = 50.38, SD = 28.88). Perceived susceptibility for all other risks were below the midpoint on the scale of zero to 100, with people perceiving themselves to be the least susceptible to West Nile Virus (M = 30.14, SD = 24.37) and drought (M = 42.66, SD = 24.20). The repeated measured ANOVA indicated

that there was a significant difference in perceived susceptibility among the different risks. Although the assumption of sphericity was violated (Mauchly's test, χ^2 (27, N = 171) = 290.93, $p < .001$, the Greenhouse-Geisser correction was used and indicated that there was a significant difference in perceived susceptibilty among the different risks, $F(4.70, 539.92) = 85.89$, $p < .001$, partial $\eta^2 = .34$ (refer to Table 3). As shown in Table 3, pairwise comparisons reveal significant differences between all pairs (in most cases $p <$ .001 and in a few cases $p < .05$), except between flood and high pollen count (HPC), flood and drought, and flood and tornado, drought and tornado, and high pollen count and heat wave, relationships between which there was no significant difference.

Immediacy. As shown in Table 2, participants believed tornado to be most immediate in its consequences (M = 78.99, SD = 30.24), followed by flood (M = 73.49, SD = 30.40), then heat wave (M = 63.18, SD = 31.54), and then West Nile Virus (M = 59.29, SD = 32.80). Climate change (M =38.70, SD = 31.99) and global warming (M = 39.01, SD = 31.74) were perceived to be the least immediate. There was a significant difference in perceived immediacy of the consequences among the different risks $F(4.19, 711.38) = 55.62$, $p < .001$, partial $\eta^2 = .25$. The assumption of sphericity was violated (Mauchly's test, χ^2 (27, N = 171) = 340.25, $p < .001$) so the Greenhouse-Geisser correction was used. Pairwise comparisons show significant differences for perceived immediacy between pairs, most at the $p < .001$ level, but there were no significant differences in perceived immediacy of consequences between climate change and global warming, between drought and West Nile Virus (WNV), WNV and heat wave, and between high pollen count and three risks (drought, heat wave, and WNV).

Personal steps. When asked their level of agreement with the statement "There are steps that I should personally take to combat the effects of ___," participants agreed with this statement most for global warming (M = 66.54, SD = 34.92) and climate change (M = 53.05, SD = 37.71), and although West Nile Virus (M = 30.99, SD = 33.67) and drought (M = 28.09, SD = 30.57) had the next highest means, the scores on these two risks were significantly smaller (at the p <.001 level), indicating that people generally felt that there was not much they could do to combat the effects of drought and West Nile Virus. Again, the repeated measures ANOVA showed that there was a statistically significant difference in the extent to which people perceived that they should take personal action to mitigate the different risks, F (3.87, 654.53) = 68.81, p < .001, partial η^2 = .29. Again, the Greenhouse-Geisser correction was used to compensate for the violation in the sphericity assumption by making the necessary adjustment to the degrees of freedom.

Abstractness. When asked about the level of abstractness associated with each risk ("___ exists in a very abstract way in my mind"), all scores were below the midpoint of the zero to 100 scale, with global warming (M = 47.27, SD = 36.99) being considered as the most abstract, followed by, climate change (M = 42.90, SD = 36.05), and then West Nile Virus (M = 40.95, SD = 36.34), then drought (M = 34.11, SD = 34.86), with tornado (M = 29.06, SD = 31.21) being considered the least abstract. The Greenhouse-Geisser correction was used to compensate for the violation in the sphericity assumption in the repeated measures ANOVA. The results indicated a statistically significant difference in the level of abstractness between the risks, F (4.57, 777.41) = 13.25, p < .001, partial η^2 = .07, but the effect was small as there was no significant difference in

abstractness for various risk pairs. For example, there was no significant difference in abstractness between climate change and three risks (global warming, high pollen count, and tornado), nor between drought and West Nile Virus.

People in other countries. When asked the extent to which the risks affect people in other countries ("___ primarily affects people in other countries"), four risks had mean scores above the midpoint, with West Nile Virus (M = 72.45, SD = 30.97), and drought (M = 64.87, SD = 31.46), being perceived as the risks that most affected people in other countries, followed by heat wave (M = 56.12, SD = 32.73), and flood (M = 55.71, SD = 33.47). The repeated measures ANOVA revealed a statistically significant difference in the level of abstractness between the risks, $F(5.52, 932.26) = 76.24$, $p < .001$, partial $\eta^2 = .31$, with a large effect size. Again, the Greenhouse-Geisser correction was used to compensate for the violation in the sphericity assumption by making the necessary adjustment to the degrees of freedom.

Primary threat of risk (environment more than people). This item asked about the extent to which people perceived that the risk affected the environment more than people, as a means of acquiring perception on whom or what was thought to be the primary target of the risk. Participants were asked to state their agreement with the following, where the blank space is each of the eight risks: "___ affects the environment more than people." Their answers revealed that they generally disagreed with this statement for all risks except climate change (M = 59.75, SD = 32.01) and global warming (M = 56.74, SD = 33.66); and that even in these cases mean scores were still less than 60 on a scale of 0 to 100.

The results indicated that people do not necessarily consider drought, flood, heat wave, and tornado to be primarily environmental risks. If these risks were considered to be primarily environmental risks, then when asked whether these risks affected the environment more than people, the means should have been at least above 50; instead the means for all of these five risks were between 40 and 45 (see Table 2). The mean score for West Nile Virus (M = 19.76, SD = 26.81) was the lowest for this item, therefore it can be assumed that this risk is perceived as having the smallest effect on the environment. If the mean scores were reverse coded to give an idea of whether the risk affected people more than the environment, then West Nile Virus would be perceived as having the greatest impact on people (versus the environment). The repeated measured ANOVA revealed a statistically significant difference between the risks in terms of the extent to which they affect the environment more than people, $F(4.90, 833.68) = 62.91$, $p < .001$, partial $\eta^2 = .27$; the Greenhouse-Geisser correction was used to compensate for the violation in the sphericity assumption by modifying the degrees of freedom.

Personal relevance. The repeated measured ANOVA revealed a statistically significant difference between the personal relevance of the different risks, $F(4.89, 827.12) = 45.28$, $p < .001$, partial $\eta^2 = .21$; and again the Greenhouse-Geisser correction for degrees of freedom was used to compensate for the violation in the sphericity assumption. Global warming (M = 62.15, SD = 36.09) was perceived as being the most personally relevant risk, followed by climate change (M = 55.75, SD = 37.26), then high pollen count (M = 41.06, SD = 36.33), and then heat wave (M = 40.08, SD = 33.74), with West Nile Virus (M = 23.81, SD = 30.20) being perceived as being the least personally relevant.

Collective efficacy. When asked to indicate their agreement that humans could work together to prevent the various risks, participants generally felt that this was most possible for global warming (M = 78.06, SD = 27.78), followed by climate change (M = 63.80, SD = 36.91). They appeared to generally disagree that collective action could lead to risk prevention for the other six risks because the mean scores for those risks fell below the midpoint, with the lowest mean for tornado (M = 14.50, SD = 24.77). The repeated measured ANOVA revealed a highly statistically significant difference (indicated by a large effect size) in the extent to which people perceived collective action could prevent the different risks, $F(4.43, 752.33) = 144.19$, $p < .001$, partial $\eta^2 = .46$); again the Greenhouse-Geisser correction for degrees of freedom was used to compensate for the violation in the sphericity assumption.

Table 3

Repeated Measures ANOVA Statistics for Pilot Study 1

Variable (Scale* or item)	F	df (within)	df (error)	Sig.	Partial η^2
Susceptibility scale*	85.885	4.702	799.345	.000	.336
Severity scale*	55.691	4.356	736.178	.000	.248
Severity	27.700	4.437	754.330	.000	.140
Serious negative consequences	50.316	4.937	839.265	.000	.228
Extreme harm	57.705	4.836	817.300	.000	.255
Large scale	66.188	4.640	779.477	.000	.283
Likelihood affected	74.710	4.799	815.873	.000	.305
Risk affected	74.884	5.090	865.283	.000	.306
Possibility affected	55.789	5.245	891.607	.000	.247

Variable (Scale* or item)	F	df (within)	df (error)	Sig.	Partial η^2
Extent affected	40.115	4.552	773.907	.000	.191
Consequences immediate	55.619	4.185	711.382	.000	.247
Personal steps	68.806	3.873	654.533	.000	.289
Abstract	13.253	4.573	777.414	.000	.072
People in other countries	76.236	5.724	932.262	.000	.311
Environment more than people	62.909	4.904	833.678	.000	.270
Personal relevance	45.275	4.894	827.118	.000	.211
Collective efficacy	144.186	4.425	752.325	.000	.459

Note: Because the assumption of sphericity was violated in all cases, the Greenhouse-Geisser correction was used in all cases except for the 'people in other countries' item, in which case the Huynh-Feldt correction was used because the value of epsilon exceeded .75 (see Field, 2012).

Choice of Risks for Pilot Study 2

The third research question asked which health risk and which environmental risk do people perceive to be most severe, but at the same time to which they perceive themselves to be the least susceptible. As mentioned in the answer to RQ2 (which asked about the differences in the characteristics of interest among the various risks), based on the mean scores, participants generally perceived all eight risks to be relatively severe (see Table 2), but they felt that they were least susceptible to West Nile Virus (M = 30.14, SD = 24.37) and drought (M = 42.66, SD = 24.20), and therefore these two risks were chosen as the health and environmental topics for the study messages, respectively.

Although the main study entailed a comparison of risk perceptions between a health risk and an environmental risk, and the factor loadings of risk characteristics from

Pilot Study 1 (see Appendix C) showed that except for global warming and climate change, all of the other risks may be perceived as health risks, several considerations went into the decision to choose drought as the environmental risk (as opposed to global warming or climate change) and West Nile Virus as the health risk. First, because the dissertation messages sought to change people's perceptions of risks deemed high in severity but low in personal susceptibility, drought and WNV seemed to be the best choices. Recall that people already felt most susceptible to global warming (M = 71.07, SD = 26.78) and climate change (M = 66.70, SD = 27.47), and in such cases, it was felt that the messages may do little to increase people's perceptions of susceptibility when such perceptions were already high. Second, when asked which risks most affected the environment more than people, West Nile Virus (M = 19.76, SD = 26.81) had the lowest mean, and with the exception of global warming and climate change, drought (M = 44.36, SD = 30.13) had the highest mean. Additionally, all of the risks seemed to be perceived as risks to people (as opposed to the environment), even in the case of climate change (M = 59.75, SD = 32.01) and global warming (M = 56.74, SD = 33.66) whose means were still relatively close to the midpoint of the scale. Third, on all characteristics except for the one dealing with collective action, drought loaded more highly on the presumed environmental dimension than did West Nile Virus (see Appendix C), making it a reasonable choice for a risk that affects both people and the environment as compared to West Nile Virus, which has consistently smaller loadings on the presumed environment dimension. The following section discusses Pilot Study 2, which tests the messages about drought and West Nile Virus.

Pilot Study 2

Purpose of Pilot Study 2

After the development of messages based on West Nile Virus and drought (topics chosen from the results of Pilot Study 1), a second pilot study was conducted to determine the efficacy of the demographic and scene similarity manipulations in the messages, specifically whether different levels (low vs. high) of these types of similarity were perceived as such by the participants. This pilot study also investigated the perceived persuasiveness of the messages as well as the appropriateness of personal relevance, thinking style (rational and experiential), personal experience, perceived health condition, and optimistic bias as a possible covariates for the main study.

Pilot Study 2 Participants

Study participants were undergraduates recruited from the basic oral communication course offered by the Department of Communication at the University of Maryland. The course fulfills the university's general education requirement for oral communication, and the Department of Communication provides about 75% of the university's sections offered in the oral communication basic course. There were 426 participants, 46.0% of whom were males and 52.6% females. Fewer than 1% of the students identified their gender as something other than male or female (e.g., transgender) and 0.7% preferred not to indicate their gender. The racial/ethnic breakdown was 60.6% Caucasian, 15.0% Asian/Pacific Islander, 10.8% Black/African American, and 6.3% Hispanic/Latino, with 4.7% indicating that they preferred not to state their race/ethnicity and 2.3% omitting an answer. The participants represented about 50 different academic

majors, with 36.6% being freshmen, 25.8% sophomores, 15.5% juniors, and 21.4 % seniors.

Questions about political philosophy, home state or country, perceived social class, job status, health insurance, health condition, personal and parental income were included because it was thought that these variables may have an influence on the processing of demographic and scene similarity in the messages, which are two of the independent variables in this study. Of the 393 students who answered the question about their political philosophy, 48.8% identified themselves as Democrats, 20.7% as Republicans, 1.6% as Green Party, with 21.1% indicating that they prefer not to reveal their political philosophy and 7.7 percent omitting an answer. Fewer than 1% of the participants indicated that they consider a country other than the United States their home, with 86.6% listing their home to be in the northeastern part of the country, and 61.9% stating that they considered Maryland their home.

Participants were about evenly split between those who had a part or fulltime job (50.0%) and those who did not (49.3%). The highest personal income reported was $60, 000, with 86.4% reporting income less than 20,000, 6.1% between $20,000 and $50,000, and only one person (0.2%) made more than $50,000; 7.3% did not report their personal income. Over three quarters of the participants (76.5%) classified themselves as middle class or upper-middle class 10.8% as upper class, and 3.3% as lower class.

Based on participants' responses, the median income of parents was $130,000, with 4.7% of parents making less than $20,000; 9.9% making between $20,000 and $50,000; 14.6 % making more than $50,000 but less than $100,000; 37.1% making between $100,000 and $200,000, and 23.7% making more than $200,000 annually. These

figures account for the 90% who answered the question about their parents' income; 10% of the participants omitted an answer to this question. Regarding coverage of health care needs, 84.3% said that they were covered under their parents' health insurance plan, 8.2% said that they have their own health insurance, 2.3% stated they had no health insurance, and 4.3% omitted an answer to the question.

Procedures for Pilot Study 2

Participants were recruited from the basic oral communication course at the University of Maryland, College Park, through the Department of Communication online SONA participant pool system. The abbreviation SONA stands for Service Oriented Network Architecture. Participants signed up through this system and were then given the URL to the questionnaire, which was hosted on SurveyMonkey. After reading through consent information, participants had the option of continuing with the survey or exiting. Participants were randomly assigned to one of eight conditions based on a 2 (demographic similarity: low, high) × 2 (scene similarity: low, high) × 3 (type of risk: health, environmental presented as health, environmental) experiment. Upon clicking the survey link, there was a news story that participants were asked to read before completing the questionnaire. Students received extra credit for their participation. There was minor deception in that participants were told that they were evaluating health and environmental risk messages for use in documentaries. At the end of the survey, there was a link to a debriefing statement.

Instrumentation for Pilot Study 2

Each questionnaire began with a news story that discussed the consequences associated with either West Nile Virus (WNV) or drought (see Appendix F). The news stories were based on the 2 (demographic similarity: low, high) × 2 (scene similarity: low, high) × 2 (risk type: health, environmental) design of the study, where WNV represented the health risk and drought represented the environmental risk. As required by the study design, there were eight news stories in all, four about WNV and four about drought. Each news story was six paragraphs long, with the first three paragraphs and the final paragraph being identical, depending on the risk, that is, the first three paragraphs and the final paragraph of the four WNV news stories were identical, and the first three paragraphs and the final paragraph of the drought messages were identical. Paragraphs four and five of all messages contained the treatment.

The first three paragraphs in every message discussed reports from reputable agencies (National Oceanic and Atmospheric Administration [NOAA] for drought and Centers for Disease Control and Prevention [CDC] for West Nile Virus) about the severity of consequences related to the particular risk during the past summer (2012). For example, the WNV messages began "This past summer (2012) the U.S. saw its largest ever outbreak of West Nile Virus. The Centers for Disease Control (CDC) reported over 5000 cases of the disease in 48 states, including 219 deaths – all in 2012 alone," and the drought messages began, "This past summer the National Oceanic and Atmospheric Administration (NOAA) reported that on a national level, the 2012 drought in the U.S. has been the worst in 50 years. According to the NOAA's drought experts, "about 64.6 percent of the U.S. experienced moderate to exceptional drought by the end

of September, 2012." The rest of the standardized portion of the WNV messages went on to address specific health consequences of WNV, and the standardized portion of the drought messages went on to address both health and environmental effects of drought. All of the messages ended with the same risk specific recommendations for mitigating the risk (see Appendix F and G for all study messages).

The treatment portion of each message was in the form of a brief story that included combinations of high and low demographic and scene similarity elements related to the study design. Each treatment portion discussed how people were affected by consequences associated with the particular risk. For example, in the low demographic–low scene similarity West Nile Virus message, a short story was told of a Hispanic couple who live and work in a rural area, and whose health was affected by the virus. And in the high demographic–high scene similarity drought message, a short story was told about the impact of drought on the town and the personal health of two undergraduate college students living in a college town in the eastern part of the United States.

The questionnaire following the story measured variables associated with narrative persuasion, namely self referencing, transportation, and identification, as well as personal relevance, perceived persuasiveness of the message, thinking style (rational vs. experiential), and perceived demographic and scene similarity using previously tested and derived scales (See Appendix E). Additionally, single items measuring optimistic bias, experience with the risk, perceived severity, perception of the primary target of the risk (people vs. environment) and message-induced discrete emotions were included. Unless otherwise noted, the items in each scale were measured on a 0 to 100 scale, where

0 is none of the characteristic and 100 is the maximum possible amount of the characteristic. Inter-item scale reliabilities were measured using Cronbach's alpha and confirmatory analyses on all scales were conducted using version 9 of the LISREL data analysis package version (Jöreskog & Sörbom, 2006). According to Hu and Bentler (1999), the following indices represent good model fit: a standardized root mean square residual (SRMR) of .08 or less, a comparative fit index (CFI) of .95 or more, and a root mean square error of approximation (RMSEA) of .06 or less. All of the scales can be found in Appendix D and the scale reliabilities for Pilot 2 are found in Table 4 and the inter-scale correlations in Table 5.

Table 4

Pilot Study 2 Reliabilities (N = 425)

Scale	No. of items	Cronbach's Alpha
Demographic similarity	10	.902
Scene similarity	10	.922
Self referencing	4	.764
Persuasiveness	4	.906
Rational Experiential Inventory (REI, Rational subscale)	5	.765
Rational Experiential Inventory (REI, Experiential subscale)	5	.885
Personal relevance	8	.942
Transportation	19	.881
Identification	10	.891

Table 5

Pilot 2 Inter-Scale Correlations with Standard Deviations (N = 425)

	DS	SS	PERS	REIr	REIe	PR	TR	ID	SR	OB
DS	1.000									
SS	.592	1.000								
PERS	.076	.092	1.000							
REIr	-.014	.042	.015	1.000						
REIe	.059	.049	.072	.123	1.000					
PR	.169	.210	.594	-.056	-.014	1.000				
TR	.301	.298	.571	.043	.021	.665	1.000			
ID	.191	.218	.587	.008	.047	.627	.775	1.000		
SR	.332	.214	.476	.035	.091	.486	.466	.426	1.000	
OB	-.163	-.170	-.087	.116	.103	-.257	-.163	-.103	-.123	1.000
SD	21.58	23.78	22.64	18.85	18.64	22.30	15.30	19.31	22.84	30.73

Demographic similarity. The demographic similarity scale consisted of 10 items based on McCroskey, Richmond, and Daly's (1975) homophily scale, measured on a scale of 0 to 100, where 0 = strongly disagree and 100 = strongly agree. Two items from the demographic similarity scale were, "The characters are from a social class very different from mine" (reverse coded), and "The characters are from an economic situation very much like mine." The complete scale is found in Appendix D. The inter-item reliability was assessed using Cronbach's alpha (α = .902). Confirmatory factor analysis indicated a reasonable fit because the SRMR was less than .08 and the CFI was more than .95 (SRMR= .061, CFI= .97, however the RMSEA was less than desirable because it was more than .06 (RMSEA= .11).

Scene similarity. The scene similarity scale consisted of 10 items and was modeled from the demographic similarity scale, which was in turn based on McCroskey, Richmond, and Daly's (1975) homophily scale. As with demographic similarity, scene similarity was measured on a scale of 0 to 100, where 0 = strongly disagree and 100 = strongly agree. Two items from the scene similarity scale were, "The characters are from a community very similar to mine," and "The college in this story is very different from mine" (reverse coded). The complete scale is found in Appendix D. The inter-item reliability was assessed using Cronbach's alpha (α = .902). Confirmatory factor analysis showed a marginally good fit based on two of the fit indices (SRMR= .06, CFI= .94), however the RMSEA was less than desirable because it was more than .06 (RMSEA= .16).

Self referencing. The self-referencing scale was based on a four-item scale designed by Burnkrant and Unnava (1989). The first two items ("This story seemed to be written with me in mind," and "This story seemed to relate to me personally") were the same as those in the original scale, except that the word "message" in the original scale was replaced with the word "story" in this pilot. The other two items were modified to fit this study, that is, the item "This message made me think of my personal experiences with _____" was replaced with "This story made me think of my personal experiences (or lack of experiences) with West Nile Virus/drought. Likewise the item, "I thought about my own risk when I was reading this message" was be replaced by "I thought about my own risk of being affected by West Nile Virus when I was reading this story." All items were measured on a scale of 0 to 100, where 0 = strongly disagree and 100 = strongly agree. The inter-item reliability for this scale (measured using Cronbach's alpha) was α =

.764. Confirmatory factor analysis indicated a reasonable fit in terms of two of the fit indices (SRMR = .06, CFI = .94) but the root mean square error of approximation was too high (RMSEA = .20).

Persuasiveness. Perceived persuasiveness was measured on a four-item scale. Participants were asked to indicate on a scale of 0 to 100 the level of their agreement that the news story was compelling, persuasive, convincing, and swaying, where 0 = strongly disagree and 100 = strongly agree. Two of the items in this scale were, "The news story I read was compelling" and "The news story I read was convincing." See Appendix D for the other two items. The inter-item reliability of this scale was $\alpha = .906$ measured. Confirmatory factor analysis revealed an excellent fit (RMSEA = 0.00, SRMR = .005, CFI = 1.00).

Individual information processing style. Information processing style (also known as thinking style) was measured using an abbreviated version of the modified Rational Experiential Inventory (REIm, Norris & Epstein, 2011; Pacini & Epstein, 1999) on a 0 to 100 point scale, where 0 = strongly disagree and 100 = strongly agree. The original scale has 42 items with three experiential subscales (intuitive, emotional, and imaginative). The shortened version used for this study had 10 items, with five items taken from the rational subscale measuring rational ability and five from the experiential subscale, measuring experiential engagement. Two items from the rational subscale were, "I try to avoid situations that require thinking in depth about something" (reverse coded) and "I prefer complex to simple problems." Two items from experiential subscale were, "I trust my initial feelings about people" and "I can usually feel when a person is right or wrong even if I can't explain how I know." The complete scale is found in Appendix D.

The inter-item reliabilities of the rational and experiential subscales were α = .765 and α = .885. A confirmatory factor analysis that fit both subscales into one model was a good fit (RMSEA = .06, SRMR = .06, CFI = .98).

Personal relevance. In this study, personal relevance was investigated as a possible covariate. Personal relevance was measured on an eight-item scale adapted from Zaichkowsky (1994) Personal Involvement Inventory (PII). Zaichkowsky operationalized *involvement* as perceived personal relevance. The original scale contained 20 bipolar adjective scales, each with seven options. For the purpose of this study eight of the bipolar pairs were used, and they were put into complete sentences. For example, the item pertaining to the unimportant–important pair read, "Please indicate the level of importance this story has to you," where 0 = not important at all, and 100 = of great importance. Likewise, the item pertaining to the trivial–fundamental pair read, "Please indicate the level of triviality or fundamentality this story has to you," where, 0 = very trivial, and 100 = very fundamental. Although in the original scale some of the bipolar pairs had to be reverse coded, in this study zero corresponded to the negative end of the scale and 100 to the positive end for all items (see Appendix D for the complete scale). The inter-item reliability for this scale (measured using Cronbach's alpha) was .942. Confirmatory factor analysis showed a relatively good fit (SRMR = .03, CFI = .98), however the RMSEA was less than desirable because it was more than .06 (RMSEA = .10).

Transportation. The transportation scale was based on Green and Brock (2000), whose study used a 19-item version of the scale adapted by Dal Cin, Zanna, and Fong (2004). Examples of items in this scale include: "I was mentally involved in this story"

and “I found myself thinking of other ways this story could have ended.” The end points for this scale were 0 = strongly disagree and 100 = strongly agree. The complete scale is found in Appendix D. The inter-item reliability for this scale (measured using Cronbach’s alpha) was .881. Confirmatory factor analysis showed a less than desirable but not terrible fit (RMSEA = .07, SRMR = .12, CFI = .92).

Identification. The identification scale was based on Cohen (2001) and Sestir and Green (2010). The wording of the scale was adapted for this study; for example, “viewing program X” in the original scale was replaced by “reading this story.” Examples of items in this scale include “I think I have a good understanding of the characters in this story” and “At key moments in this story, I felt I knew exactly what the characters were going through.” The end points of this scale are 0 = strongly disagree and 100 = strongly agree. The complete scale is found in Appendix D. The inter-item reliability for this scale (measured using Cronbach’s alpha) was .891. The confirmatory factor analysis revealed a marginal fit in terms of the standardized root mean square residual (SRMR = .075) but based on the other two indices, the fit was less than desirable (RMSEA = .15, CFI = .92).

Single items. The Pilot Study 2 questionnaire also contained the following single items rated on a scale of 0 to 100, where 100 represents strongly agree and 0 represents strongly disagree: target of the risk (“_____ is more of a threat to the environment than to people”); personal experience (“I have been personally affected by_____”); and severity (“I believe that _____ is severe”). Optimistic bias was measured by asking three questions, (1) “To what extent are you likely to be affected by _____”; (2) “To what extent is someone very similar to you likely to be affected by _____”; and (3) “To what

extent is someone very different from you likely to be affected by _____." The difference between (1) and (2), and between (1) and (3) indicates the level of optimistic bias between oneself and a similar other, and between oneself and a different other, respectively. Six discrete emotions (fear, frustration, sadness, worry, hope, and happiness were measured using a general statement that asked, "Please indicate the extent to which the story made you feel ____."

Results of Pilot Study 2

Before any analyses were carried out, the data were screened for missing values, outliers, implausible values, and for violations of the basic general linear model (GLM) assumptions of normality, linearity, and homogeneity of variance. During the cleaning process it was discovered that some participants inserted the incorrect story number, so this was corrected, and cases with absolutely no responses were deleted (there were 17 such cases); three additional cases were deleted because participants abandoned the study after answering between 3% and 15% of the questionnaire. The deletions left 426 cases from the original 446 who originally consented to participate in the study. In terms of the GLM assumptions, normality was checked using skewness and kurtosis and all variables were approximately normal or moderately skewed. Because all skewness values were under 1.00, no transformations were done. Approximately 15% of the variables has kurtosis values above 1.00, but in these cases the kurtosis statistics were only slightly above 1.00, with the highest value being 1.294 (see Appendix A). Linearity was checked using graphical means by regressing standardized residuals on predicted values and no patterns were seen. Homogeneity of variance are reported along with the results of the various analyses.

Pilot study 2 manipulation checks. The efficacy of the similarity manipulations was checked using univariate analysis of variance. Participants in the high demographic similarity condition (M = 52.31, SD = 20.60) perceived that they had a statistically significantly higher level of demographic similarity with the characters in the story than participants in the low demographic similarity condition (M = 31.80, SD = 17.60), $F(1, 421) = 121.19$, $p < .001$, $\eta^2 = .224$. The Levene's Test of Equality of Error Variances was not significant $F(1, 421) = 2.201$, $p = .139$), suggesting equal variances. Likewise, participants in the high scene similarity condition (M = 58.58, SD = 21.99) perceived that they had a statistically significantly higher level of scene similarity with the scenes in the story than participants in the low scene similarity conditions (M = 31.95, SD = 17.08), $F(1, 415) = 193.37$, $p < .001$, $\eta^2 = .318$. The Levene's test was significant $F(1, 415) = 10.84$, $p < .05$), suggesting unequal variances but a t test using the unequal variances results confirmed a statistically significant difference between the high and low scene similarity conditions, $t(352.79) = 13.60$, $p < .001$, $d = 1.363$.

Persuasiveness. In general, the messages were shown to be somewhat persuasive *(*M = 60.25, SD = 22.64), but a 2 (demographic similarity: high, low) × 2 (scene similarity: high, low) ANOVA showed that there were no main effects, nor was there an interaction between the two types of similarity. Consequently, for the main study, the format of the message was changed from a news story to a flyer (see Appendix G).

Pilot study 2 covariates. An analysis of covariance was run to determine whether the relationship between the independent variables (risk frame, demographic similarity, scene similarity) and the dependent variables (persuasiveness, self referencing, identification, transportation) was influenced by covariates, namely, personal relevance,

thinking style (rational and experiential), personal experience, perceived health condition, and optimistic bias. Personal relevance was the only statistically significant covariate on all dependent variables. Optimistic bias and personal experience were statistically significant as covariates in the case of the narrative persuasion variables only. Personal health was statistically significant as a covariate only when identification was the dependent variable, and thinking style was not a significant covariate, except in the case when a single item (severity) was used as the dependent variable.

Main Study

Participants for Main Study

Participants were 568 undergraduates taking the basic communication general education course at the University of Maryland, College Park. There were 283 (49.8%) females and 278 (48.4%) males; one person identified as gender neutral and one as transgender, four participants indicated that they preferred not to answer that question, and four omitted an answer. More than half of the participants (52.6%) identified themselves as freshmen, 13.7% as sophomores, 14.4% as juniors, and 18.5% as seniors; only 4 participants (0.7%) did not indicate their university standing. Over 70 different majors were represented by the sample. The vast majority of the participants fell into the 18–21 age group (85.0%), with 12.1% falling in the 22–25 age group.

When asked to indicate the racial/ethnic group with which they most identified, 60.9% indicated White/Caucasian, 14.1% Asian/Pacific Islands, 12.3% Black/African American, and 6.7% Hispanic/Latino; one person identified as Native American, 20 stated that they preferred not to answer the ethnicity question, and 13 people omitted an answer altogether. Questions about social class, personal and parental income, health

insurance, homestate/country, and political philosophy were asked because of the study's interest in demographic similarity between the participants in the study and the characters in the study narratives. The vast majority (80.1%) of participants categorized themselves as being either middle class (36.8%) or upper middle-class (43.0%), with 7.2% identifying themselves as being in the upper class; 9.7% categorized themselves as being in the working class (7.0%) or lower class (2.7%), and seven participants did not answer the question about social class. There were slightly more participants with a full-time or part-time job (51.1%) than without (47.9%); six participants (1.1%) did not indicate their job status.

More than half of the participants (60%) stated that they considered Maryland their home, with roughly an additional 20% considering another state in the South Atlantic region of the United States their home. Only about 2% considered a country outside of the United States their home. This variable (where one considers home) was included because it was thought that it could influence the way scene similarity in the message was processed.

With regard to health insurance, 82.9% of the participants stated that they were covered under their parents' health insurance plan, 8.5% stated that they had their own health insurance, and 1.9% stated that they did not have health insurance; eight participants (0.9 %) indicated that they were on Medicaid, and 3.7% did not answer the health insurance question.

Procedures for Main Study

Participants were recruited through the Department of Communication online participant pool system. Upon registration, participants were guided to the

SurveyMonkey link where the study was posted. Participants were randomly assigned to one of 8 conditions, in which they were asked to read a brochure on drought (framed either as a health risk or an environmental risk) and then complete a questionnaire. Participants received extra credit for their participation.

Instrumentation. Instrumentation involved the use of all scales used in Pilot 2 as well as a few additional scales, including the severity and susceptibility scales from Pilot Study 1 (see Appendix E for this instrument). A confirmatory factor analysis was conducted for all main study scales simultaneously to determine whether the latent constructs accounted for statistically significant amounts of variance in their related items, and whether there were significant cross-loadings between scales for any of the items. Based on the results of this CFA, a few changes were made to the scales used in Pilot 2, details of which are given in the following section. Although reliabilities and fit indices of the confirmatory factor analyses are given below, examples of items were not repeated if the details were already given in the instrumentation section of either Pilot Study 1 or Pilot Study 2. Inter-item reliabilities are found in Table 6 and inter-scale/inter-item correlations are found in Table 7.

Main Study Dependent Variables

Susceptibility. As in Pilot Study 1, the susceptibility scale comprised three items from the susceptibility subscale of the Risk Behavior Diagnostic Scale (RBD; Witte, McKeon, Cameron, & Berkowitz, 1995) and one additional item regarding the extent to which one could be personally affected by the risk. The internal consistency of the scale was measured using Cronbach's alpha ($\alpha = .904$). Confirmatory factor analysis showed

that a good fit based on two fit indices (SRMR = .020, CFI = .99) but the root mean square error of approximation was larger than desired (RMSEA = .13).

Severity. The severity scale included the severity subscale from the Risk Behavior Diagnostic Scale (RBD; Witte, McKeon, Cameron, & Berkowitz, 1995) and one additional item regarding the perceived scale of the consequences of the risk, just as in Pilot Study 1. Internal consistency of the scale was measured Cronbach's alpha (α = .828). Confirmatory factor analysis showed a good fit based on two out of three fit indices (SRMR = .042, CFI = .97, RMSEA = .16).

Demographic similarity. The demographic similarity scale consisted of nine items, one item less than the 10-item version based on McCroskey, Richmond, and Daly's (1975) homophily scale that was used in Pilot Study 2. Results from the simultaneous CFA suggested that an item ("The characters in this story and I come from a very similar geographic region") that was originally part of the demographic similarity scale was actually a better indicator of scene similarity than demographic similarity; this item was therefore dropped from the demographic similarity scale and transferred to the scene similarity scale. Again demographic similarity was measured on a scale of 0 to 100, where 0 = strongly disagree and 100 = strongly agree. The inter-item reliability was assessed using Cronbach's alpha (α = .899). As was the case with the scene similarity scale, confirmatory factor analysis showed a less than desirable fit (SRMR= .13, CFI= .85, RMSEA = .27).

Scene similarity. This scale included the identical 10-item version (modeled from McCroskey, Richmond, and Daly's (1975) homophily scale) used in Pilot Study 2, and an additional item transferred from the demographic similarity scale. As previously noted,

results from the simultaneous CFA suggested that this new item ("The characters in this story and I come from a very similar geographic region") was a better indicator of scene similarity scale than demographic similarity. As in the case of Pilot Study 2, scene similarity was measured on a scale of 0 to 100, where 0 = strongly disagree and 100 = strongly agree. The scale showed good internal consistency (α = .887) however as was the case with demographic similarity, the confirmatory factor analysis showed a less than desirable fit (SRMR = .12, CFI = .86, RMSEA = .24).

Self referencing. The same four-item scale designed by Burnkrant and Unnava (1989) that was used in Pilot 2 was reused in the main study, but an additional item ("While reading this story, I felt as if I were part of what was taking place") was included. This new item was transferred from the identification scale after modification indices from the simultaneous CFA suggested that it item cross-loaded onto both the self-referencing and the identification scales. Responses were measured on a scale of 0 to 100, where 0 = strongly disagree and 100 = strongly agree. The inter-item reliability for this scale (measured using Cronbach's alpha) was .803. The confirmatory factor analysis indicated an acceptable fit for one fit index (SRMR= .071), a reasonable fit for another (CFI= .93), although the other fit index was poor (RMSEA = .18).

Identification. This scale consisted of eight items, two less than the 10-item version based on Cohen (2001) and Sestir and Green (2010) that was used in Pilot Study 2. The simultaneous CFA showed that an item ("While reading this story, I felt as if I were part of what was taking place") cross-loaded onto both the identification and the self-referencing scale therefore it was dropped from the identification scale and transferred to the self-referencing scale. The simultaneous CFA also revealed that another

item ("While reading this story, I forgot myself and was fully absorbed") was a better indicator of transportation than identification therefore this item was transferred to the transportation scale. Identification was measured on a 0 to 100 point scale, where 0 = strongly disagree; 100 = strongly agree. The inter-item reliability for this scale (measured using Cronbach's alpha) was .882. The confirmatory factor analysis revealed a less than desirable fit (SRMR= .098, CFI= .86, RMSEA = .23).

Transportation. The 19-item version of the Green and Brock (2000) transportation scale that was adapted by Dal Cin, Zanna, and Fong (2004) and used in Pilot Study 2 was shortened to 11 items in the main study data collection however only seven of these items were retained as part of the transportation scale.[2] Three of the items from the 11-item version were dropped because the simultaneous CFA revealed that the latent factor transportation accounted for a relatively miniscule amount of variance in each of these three indicators, specifically: "I found it difficult to tune our activity around me while I was reading the story" (R^2 = .008); "I easily put the story out of my mind after reading it" (R^2 = .013); and "My mind often wandered while I was reading the story" (R^2 =.000)[3]. Another item ("I sometimes felt as though I was part of this story') was dropped from the transportation scale because it had similar wording to an item ("While reading this story, I felt as if I were part of what was taking place") in the identification scale that was transferred to the self-referencing scale because of a problem with cross-loading. In addition to the four items dropped from the 11-item version of the scale, a new item ("While reading this story, I felt as if I were part of what was taking place") was transferred from the identification scale to the transportation scale because it was shown to be a better indicator of transportation than identification. Ultimately the transportation

scale used in the main study analyses consisted of eight items. As in Pilot Study 2, participants were asked to state their level of agreement with specific statements on a scale of 0 to 100, where 0 = strongly disagree and 100 = strongly agree. The inter-item reliability for the transportation scale (measured using Cronbach's alpha) was .888. Confirmatory factor analysis showed that the model fit was less than desirable, but acceptable (SRMR= .058, CFI= .94, RMSEA = .15).

Behavioral intention, behavioral expectation, and response efficacy. Warshaw and Davis (1985) and Sheppard et al. (1988) noted that there is a difference between one's intention to perform a specific behavior, and one's estimates that he or she will actually follow through with that behavior. To avoid potential conflation between behavioral intention and behavioral expectations, both these constructs were measured. The extent to which participants thought that a specific behavior would actually reduce the risk was also measured. The three constructs (behavioral intention, behavioral expectation, response efficacy) were measured using slight variations of the same items. Analyses were done using the three of the items that were the same across all treatment groups; these items were related to water conservation and information seeking. For example the behavioral intention item regarding water conservation stated, "Write a number between 0 and 100 to indicate the extent to which you *intend* to increase water conservation now." The behavioral expectation version of that item was identical except that *intend* was changed to *expect* and the word *actually* was included (i.e., "…indicate the extent to which you expect to actually increase water conservation now"). The words intend and expect were capitalized in the questionnaire for emphasis and to highlight the distinction between the terms.

The response efficacy version of the water conservation item stated, "Write a number between 0 and 100 to indicate the extent to which increasing water conservation now will actually reduce the risk you read about in the story." The information seeking items asked participants to indicate the extent to which they intended and expected to seek information on drought within one week of reading the message, and another set of items asked them to indicate the extent to which they intended and expected to seek information about drought whenever they had time. The response efficacy items regarding information seeking asked participants to indicate the extent to which information seeking would reduce the risk they read about in the message.

Single-items. Apart from the demographic questions, the main study consisted of a few single items that were identical to the single items asked in Pilot Study 2 about the perceived primary target of the risk (people vs. the environment), and personal experience with the risk. An additional item intended to measure vicarious experience with the risk was also added in the main study; the item stated "Think of someone you personally know who has experienced the risk described in the story. To what extent has that person been affected by this risk?" and was measured on a scale of 0 to 100, where 0 = the person has not been affected at all and 100 = the person has been affected to a great extent.

Main Study Covariates

Personal relevance. Based on the results of Pilot Study 2, personal relevance was used as a covariate in some of the analyses, however as shown in the supplemental analyses (reported at the end of Chapter 4), personal relevance also turned out to be an important independent variable when translated into categorical format. The personal

relevance scale was identical to the eight-item bipolar scale adapted from Zaiwkowsky (1994) Personal Involvement Inventory (PII) that was used in Pilot Study 2. Zaichowsky operationalized *involvement* as perceived personal relevance. The inter-item reliability (measured using Cronbach's alpha) was .940. Confirmatory factor analysis revealed a good fit (SRMR= .029, CFI= .98, RMSEA = .12).

Climate change. The scale measuring attitude toward climate change was adapted from Kellstedt et al. (2008) and consisted of eight items measured on a 0 to 100 scale, where 0 = strongly disagree and 100 = strongly agree. The main modification to the Kellstedt et al.'s scale is that, for this study, the items only asked about climate change, whereas the original scale asked about both climate change and global warming in each item. Another modification was that this study included a 25-year time factor in each item, whereas the original scale included the 25-year time factor in only two of the items. Two of the items used in this study were, "Climate change will have a noticeably negative impact on my overall quality of life in the next 25 years" and "Climate change will have a noticeably negative impact on the environment in my state in the next 25 years." The inter-item reliability (measured using Cronbach's alpha) was .947. Confirmatory factor analysis indicated a good fit for two out of three goodness of fit indices (SRMR= .043, CFI= .95, RMSEA = .17).

Optimistic bias. As in Pilot Study 2, optimistic bias was measured by asking about the likelihood of the risk affecting self, someone very similar to self, and someone very different from self, and then taking the difference score between risk to self and risk to others. However only the difference score between risk to self and risk to someone different from self was used as a covariate in the main study analyses. The statistical

assessment of personal relevance, climate change, and optimistic bias as suitable covariates for the main study are discussed in the following section on data preparation.

Main Study Data Preparation

Data cleaning. Although the initial number of study participants was 586, not all of the cases were usable. I deleted 18 cases associated with abandonment of the study; these cases ranged from having no answers whatsoever to having only a small portion of the questionnaire completed (0 - 30%). After deletions the final sample size was 568.

After deletions, I proceeded to correct the story number in cases where it was incorrect. Whenever participants indicated an incorrect story (flyer) number, there was a way to tell which number they should have written. This is because during the set-up process, each randomized story was assigned a unique question that required the participant to confirm the number of the flyer in his or her condition. For example, people who read flyer 5 were the only people who had access to question 24, therefore if a number other than 5 were written in answer to question 24, it was mistake and was therefore changed to the correct number; 15 such corrections were made.

GLM assumptions. I then checked my data to see if they confirmed to the basic general linear model (GLM) assumptions. Normality was evaluated using skewness and kurtosis, and as in the case of Pilot Studies 1 and 2, Bulmer's (1965) rule of thumb was used such that highly skewed distributions were considered to have skewness values smaller than -1 or bigger than 1, moderately skewed distributions were those within -1.0 and -0.5, and within 0.5 and 1.0; and approximately symmetric distributions were those between -0.5 and 0.5. Except for two items in the severity scale, SEV2 and SEV3, which according to Bulmer's rule of thumb were highly negatively skewed (skewness statistic -

1.157 and -1.079, respectively), and variables in the anger and hope scales (both of which are not crucial to the dissertation study), all of the other variables were either approximately symmetric or moderately skewed, and therefore no transformations were done on these variables (see Appendix A for skewness and kurtosis values). The two highly skewed severity items were transformed using log10 (see Tabachnick & Fidell, 2013); the skewness value for the transformed SEV2 was -0.428, and -0.668 for the transformed SEV3. The principal component of the severity scale was extracted and subsequently used as an index of severity. Most of the distributions had kurtosis values under 1.00 except for the previously mentioned SEV2 and SEV3 in the severity scale, some items in the anger and hope scales, and in the perceived scene similarity scale, but even then, the values were generally just slightly larger than 1.00.

Linearity was assessed by looking at bivariate scatterplots between a number of variable pairs, which generally displayed the oval shape typical of linear relationships (Tabachnick & Fidell, 2013). For datasets with a large number of variables, Tabachnick and Fidell (2013) suggested that because it may be impractical to check bivariate scatterplots for all pairs of variables that researchers can concentrate on scatterplots of highly skewed variables. Because two of the items in the severity scale were highly skewed, a multivariate scatterplot of the four severity items was checked for linearity. The plots did not show any major deviations from the typical oval shape indicating linearity. Additionally, standardized residuals against predicted values were assessed for patterns; no patterns were seen therefore the relationship between variables was considered to be relatively linear.

Homogeneity of variance was tested during the ANCOVA analyses reported in Chapter 5, and unless otherwise noted, the Levene's test of equality of error variances was not significant, suggesting equal error variance of the dependent variable across groups. According to Tabachnick and Fidell (2013), unequal group variances are less of a problem in one-way ANOVA than in factorial designs, and Pallant (2010) suggested that in cases of unequal variances in factorial ANOVA that a stricter significance level (.01 instead of .05) be used as the significance criterion.

Evaluating covariates for the main study. Based on the results of Pilot Study 2, personal relevance and optimistic bias were retained as covariates for the main study, and attitude towards climate change was also included as a covariate. In an article about the health impacts of climate variability and change on human health, Greenough et al. (2001) noted the potential of climate change to influence the probability of extreme weather events such as drought[4]. With this in mind, a statement about the influence of climate change on drought was included in all of the study messages for the main study.

Analysis of covariance (ANCOVA) assumes that covariates are reliable, that they do not correlate highly with each other, that there is a linear relationship between the covariates and the dependent variables, and that the regression slopes of the covariates and the dependent variables are equal (homogeneity of regression), meaning that the relationship between the covariates and the dependent variable should be the same for all groups. Additionally, the covariates should not be influenced by the treatment (Pallant, 2010).

The reliability of the covariates have been noted in the instrumentation section of this chapter as well as in Table 6. Attitude towards climate change and personal relevance

had the highest reliabilities (α = .947 and α = .940, respectively) of all the measured variables.

Table 6

Main Study Reliabilities (N = 568)

Scale	No. of items	Cronbach's Alpha
Severity	4	.828
Susceptibility	4	.904
Climate change attitude	8	.947
Demographic similarity (perceived)	9	.899
Scene similarity (perceived)	11	.887
Self referencing	5	.803
Identification	8	.882
Transportation	8	.888
Personal relevance	8	.940

The correlations among the covariates are shown in Table 7, which also shows correlations between the covariates and the dependent variables (severity, susceptibility, self referencing, identification, transportation, behavioral intention, behavioral expectation, response efficacy). The covariates are listed in the first three columns. Pallant (2010) suggested that if variables have a correlation of .80 or higher, both should not be used as covariates. As shown in Table 7, the highest correlation between a covariate pair was .375 between personal relevance and attitude towards climate change. Linearity between the covariates and the dependent variables was determined by assessing the significance of the test for linearity in the ANOVA table of the compare means panel of SPSS version 21; a significance level of .05 was used. There were no violations for the relationship between personal relevance and the dependent variables, and between attitude toward climate change and the dependent variables[5]. However the

test showed that optimistic bias had a nonlinear relationship with severity and identification, as well as with two of the behavioral intention variables (regarding water conservation and seeking information when there is time) and two of the response efficacy variables (regarding seeking information within one week of reading the message and seeking information when there is time).

The suitability of the covariates was also determined by testing for homogeneity of regression slopes to ensure that there is a constant relationship between the covariates and the dependent variables across treatment groups. This is done by testing for an interaction between the independent variables and the covariates (see Pallant, 2010; Tabachnick & Fidell, 2013). Violations of homogeneity of regression were found for personal relevance (covariate) when self referencing, identification, and transportation were the dependent variables, when optimistic bias was the covariate and transportation the dependent variables, and when attitude to climate change was the covariate and behavioral intention and behavioral expectation regarded water conservation. As will be noted in Chapter 4 (Results of the Main Study), whenever covariates violated the homogeneity of regression assumption they were not included in the analyses for the specific dependent variables involved in the violation.

Table 7

Main Study Inter-scale/Inter-Item Correlations and Standard Deviations (N = 568)

	PR	OB	CC	SEV	SUS	SR	ID	TR	SS	DS	BI1	BI2	BI3	BE1	BE2	BE3	RE1	RE2	RE3
PR	1.000																		
OB	-.202	1.000																	
CC	.375	-.057	1.000																
SEV	.562	.064	.356	1.000															
SUS	.607	-.382	.410	.406	1.000														
SR	.544	-.276	.337	.283	.473	1.000													
ID	.400	-.078	.320	.381	.321	.508	1.000												
TR	.533	-.166	.332	.299	.399	.598	.646	1.000											
SS	.092	-.287	.040	-.052	.174	.290	.169	.168	1.000										
DS	.140	-.218	.013	-.019	.176	.276	.086	.135	.514	1.000									
BI1	.466	.011	.294	.335	.243	.237	.220	.287	-.046	.045	1.000								
BI2	.516	-.103	.237	.277	.345	.372	.217	.404	.020	.142	.456	1.000							
BI3	.556	-.067	.264	.296	.317	.368	.247	.391	.056	.113	.464	.764	1.000						
BE1	.463	.003	.281	.316	.231	.254	.203	.320	-.056	.028	.765	.439	.466	1.000					
BE2	.514	-.109	.266	.222	.363	.376	.248	.416	.058	.125	.397	.794	.672	.508	1.000				
BE3	.507	-.104	.270	.236	.325	.367	.243	.380	.058	.084	.398	.682	.808	.503	.810	1.000			
RE1	.400	.054	.266	.398	.214	.171	.216	.253	-.101	-.125	.414	.297	.310	.425	.279	.288	1.000		
RE2	.411	-.021	.262	.297	.280	.272	.221	.328	.056	.090	.277	.420	.381	.294	.458	.415	.449	1.000	
RE3	.424	-.034	.275	.283	.271	.321	.263	.370	.087	.077	.272	.403	.411	.293	.485	.473	.446	.856	1.000
Std.Dev.	23.17	34.59	24.88	20.81	24.86	22.34	21.92	22.20	23.12	22.00	30.02	30.08	31.07	32.31	28.63	31.31	30.57	32.97	32.29

Note. PR: personal relevance; OB: optimistic bias; CC: climate change attitude; SEV: severity; SUS: susceptibility; SR: self referencing; ID: identification; TR: transportation; SS: perceived scene similarity; DS: perceived demographic similarity; BI: behavioral intention; BE: behavioral expectation; RE: response efficacy. BI1/BE1/RE1: conserve water now; BI2/BE2/RE2: seek information about drought with one week of reading message; BI3/BE3/RE3: seek information about drought when there is time.

Chapter 4: Results of the Main Study

This chapter summarizes the results of the main study, a 2 (risk frame: health, environmental) × 2 (demographic similarity: high, low) × 2 (scene similarity: high, low) between-subjects experiment in which participants were randomly assigned to read a narrative about drought before completing a questionnaire that measured variables related to risk perception, narrative persuasion, and behavioral intention (see Table 8). The hypotheses were tested using analysis of covariance, and the same procedure was used to answer the research questions.

Table 8

Main Study Design

		Scene Similarity			
		Environmental Risk [Health Context] Drought-Health		Environmental Risk [Env. Context] Drought-Environmental	
		Low	High	Low	High
Demographic Similarity (DemSim)	Low				
	High				

Personal relevance, optimistic bias, and attitude toward climate change were chosen as the covariates having met all of the covariate-related assumptions required for ANCOVA (see the end of Chapter 3 for details on covariate testing). The analyses were done simultaneously by entering the three independent variables (risk frame, demographic similarity, and scene similarity) into the 2 × 2 ×2 ANCOVA model for each of the eight dependent variables (susceptibility, severity, behavioral intention, behavioral

expectation, response efficacy, identification, transportation, self-referencing). The manipulation checks were included in the ANCOVA analyses. The statistical significance of the covariates and model R^2 are noted in Table 10.

Group means reported in the text are estimated marginal means (rather than descriptive means) because they reflect the adjustment for the covariates in the model. The Bonferroni adjustment was used in all cases to correct for family-wise Type I error. Unless otherwise stated, the Levene's test was not significant, therefore equal variances between groups are assumed. Estimated marginal means and standard errors for treatment groups in the 2 × 2 × 2 ANCOVA model for each outcome variable are found in Appendix H.

Manipulation Checks

Demographic similarity. The induction for demographic similarity was successful, F (1, 534) = 207.285, $p < .001$, η^2=.249). Participants in the high demographic similarity conditions perceived greater demographic similarity (M = 51.95, SE= 1.15) between themselves and the characters in the narrative than participants in the low demographic similarity conditions (M = 28.69, SE = 1.13).

Scene similarity. The scene similarity induction was also successful, F (1, 534) = 181.420, $p < .001$, η^2=.221. Participants in the high scene similarity conditions perceived greater scene similarity (M =53.57, SE = 1.11) between their locale and the locale in the narrative than participants in the low scene similarity conditions (M =32.47, SE = 1.10).

Risk frame. The risk frame induction was also successful, F (1, 532) = 6.189, $p < .05$, η^2=.011. Participants were asked to indicate the extent of their agreement with the

statement, “The risk described in the story is more of a threat to the environment than to people.” Participants in the environmental frame perceived the risk to be more of a threat to the environment (M = 48.38, SE = 1.78) than participants in the health frame (M =41.97, SE = 1.86).

Following are results related to the hypotheses and research questions laid out in Chapter 2. The results summarize main effects and interactions of the independent variables (risk frame, scene similarity, demographic similarity) on the dependent variables (also referred to as outcome variables in this dissertation), which have been divided into three groups, namely, risk perception (susceptibility and severity); behavior related variables (behavioral intention, behavioral expectation, and response efficacy); and narrative persuasion (identification, transportation, and self-referencing). Results regarding the behavior-related variables are specific to the three recommendations that were common to all treatment groups, namely, “increase water conservation now”; “seek more information about drought within one week of participating in this study,” and, “seek more information about drought whenever I have the time.”

Effect of Framing on Outcomes

H1. Hypothesis 1 predicted a main effect for risk frame such that there would be greater levels of susceptibility, severity, behavioral intention, behavioral expectation, response efficacy, identification, and self-referencing for the health frame than for the environmental frame. This hypothesis was only partially supported. There was a main effect for risk frame on susceptibility, F (1,534) = 9.992, $p < .05$, η^2=.009; there was higher perceived susceptibility for the environmental frame (M =40.00, SE=1.07) than for health frame (M =35.11, SE =1.11). There was however no main effect for risk frame on

severity, F (1,534) = .296, p = .587; people in the health frame condition (M =69.20, SE =1.04) perceived a similar level of severity as those in the environmental frame condition (M =68.42, SE =1.00).

There was a main effect for risk frame on behavioral intention regarding one of the three behavioral recommendations, conservation of water, F (1,532) = 19.745, p < .001, η^2= .026; participants in the health frame (M = 63.96, SE = 1.60) condition had a greater intention to conserve water than those in the environmental frame condition (M = 54.11, SE = 1.53). There were however no main effects for seeking information within one week of reading the message, F (1,531) = 1.794, p = .181, or for seeking information whenever there is time, F (1,533) = 0.276, p = .600. There was also a main effect for risk frame on behavioral expectation to conserve water, F (1,533) = 4.118, p < .05, η^2= .006; participants who read the health-framed message (M = 52.69, SE = 1.77) had a greater behavioral expectation than those who read the environmental-framed one (M = 47.71, SE = 1.70). No main effects were seen however for seeking information within one week of reading the message, F (1,532) = 1.457, p = .228, or for seeking information whenever there is time, F (1,534) = 0.005, p = .941.

There was a main effect for risk frame on response efficacy for two of the behavioral recommendations: seeking information within one week of reading the message, F (1,533) = 39.945, p < .001, η^2= .056, and seeking information whenever there is time, F (1,533) = 32.249, p < .001, η^2= .045. Perceptions about the extent to which seeking information within one week would actually reduce the risk was greater for participants in the health frame (M = 45.58, SE = 1.77) than for those in the environmental frame (M = 30.33, SE = 1.72). Likewise, perceptions about the extent to

which seeking information whenever there is time would actually reduce the risk was greater for the health frame (M = 46.03, SE = 1.79) than for the environmental frame (M = 31.66, SE = 1.70). There was no main effect for response efficacy in terms of conserving water, F (1,534) = 0.004, p = .950; participants in the health frame condition (M =62.60, SE =1.72) perceived a similar level of response efficacy as those in the environmental frame condition (M =62.75, SE =1.64).

There were no main effects for risk frame on the narrative persuasion variables: identification, F (1,534) = .000, p = .994; transportation, F (1,534) = 0.523, p = .470; and self-referencing, F (1,534) = 0.913, p = .340. The level of identification for the health frame (M =49.32, SE =1.17) was similar to that for the environmental frame (M =49.31, SE =1.12). Likewise, participants who read the health-framed message (M =37.92, SE =1.12) condition experienced a similar level of transportation as those who read the environmental-framed one (M = 36.43, SE =1.14). And, self referencing occurred at a similar level in the health frame (M =33.09, SE =1.12) as in the environmental frame (M =31.60, SE =1.07) conditions.

Effect of Similarity on Outcomes

H2. Hypothesis 2 predicted greater levels of susceptibility, severity, behavioral intention, behavioral expectation, identification, transportation, and self-referencing when both demographic similarity and scene similarity were high rather than low. This hypothesis was largely unsupported with two exceptions. The first exception was that there was a main effect for scene similarity on self-referencing, F (1, 534) = 6.114, $p < .05$, $\eta^2 = .007$; people engaged in more self-referencing when scene similarity was high (M = 34.26, SE = 1.10) than when it was low (M = 30.42, SE = 1.09). There was

however no main effect for demographic similarity on self-referencing, F (1, 534) = 2.676, p = .102. No group differences were seen for the other narrative persuasion processes (identification and transportation) for either type of similarity. There was no main effect for demographic similarity, F (1,534) = 0.192, p = .661, or scene similarity, F (1, 534) = 0.344, p = .558 on identification, and no main effect for demographic similarity, F (1, 534) = 0.875, p = .350, or for scene similarity on transportation, F (1, 534) = 0.178, p = .673.

The second exception in the results for hypothesis 2 was that there was a main effect for scene similarity on behavioral intention regarding one of the three behavioral recommendations, namely, intention to conserve water, F (1, 532) = 5.155, $p < .05$, η^2= .007; participants in the low scene similarity condition (M = 61.55, SE = 1.56) had greater behavioral intention to conserve water than those in the high scene similarity condition (M = 56.52, SE = 1.57). No other main effects emerged. There were no differences between the high and low scene similarity conditions for seeking information in one week, F (1, 532) = 0.381, p = .537, or seeking information whenever there is time, F (1, 532) = 0.000, p = .989. There was also no main effect for demographic similarity on behavioral intention for any of the recommendations: conserve water, F (1, 532) = .077, p = .782; seek information within one week, F (1, 532) = 1.638, p = .201, and seek information when there is time, F (1, 532) = 1.238, p = .266.

There was no main effect for demographic similarity on behavioral expectation for any of the recommendations: conserve water F (1, 533) = 0.263, p = .608; seek information within one week, F (1, 532) = 1.886, p = .170, and seek information when there is time, F (1, 534) = 2.663, p = .103. Likewise, there was no main effect for scene

similarity on behavioral expectation for any of the recommendations: conserve water, F (1, 533) = .795, p = .373; seek information within one week, F (1, 532) = 1.454, p = .228, and seek information when there is time, F (1, 534) = 0.267, p = .606.

There were also no differences between the high and low conditions for either type of similarity for the risk perception variables. There was no main effect for demographic similarity on susceptibility, F (1, 534) = 0.356, p = .551, or scene similarity on susceptibility, F (1, 541) = .202, p = .653. There was also no main effect for demographic similarity on severity, F (1, 534) = 1.916, p = .167, or for scene similarity on severity, F (1, 534) = .444, p = .506.

Effect of Risk Frame × Similarity on Outcomes

H3. Hypothesis 3 predicted a two-way interaction between risk frame and demographic similarity (H3a), as well as a two-way interaction between risk frame and scene similarity (H3b) on susceptibility, severity, behavioral intention, behavioral expectation, identification, transportation, and self-referencing. In other words it was expected that the influence of risk frame on these variables would be moderated by the level of similarity (both scene and demographic) in the message. This hypothesis was largely unsupported except for the risk frame × scene similarity interaction for identification and transportation, and for behavioral expectation to conserve water.

There was an interaction between risk frame and scene similarity for identification F (1,534) = 5.701, $p < .05$, η^2=.008 (see Figure 1). Moving from low to high scene similarity resulted in an increased level of identification for the health frame condition (M = 49.14, SE = 1.69 for low scene similarity, and M = 54.25, SE = 1.78 for high scene similarity), but caused a decrease in identification for the environmental frame

(*M* = 53.44, *SE* = 1.68 for low scene similarity; and *M* = 50.44, *SE* = 1.64 for high scene similarity). There was also an interaction between risk frame and scene similarity on transportation, F (1, 530) = 6.376, $p < .05$, η^2=.008 (see Figure 2). Moving from low to high scene similarity resulted in an increase in transportation for the health frame condition (*M* = 35.40; *SE* = 1.59 for low scene similarity, and *M* = 40.11, *SE* = 1.67 for high scene similarity), but for the environmental frame condition, moving from low to high scene similarity led to a decrease in transportation (*M* = 38.28, *SE* = 1.59 for low scene similarity and *M* = 34.91, *SE* = 1.55 for high scene similarity).

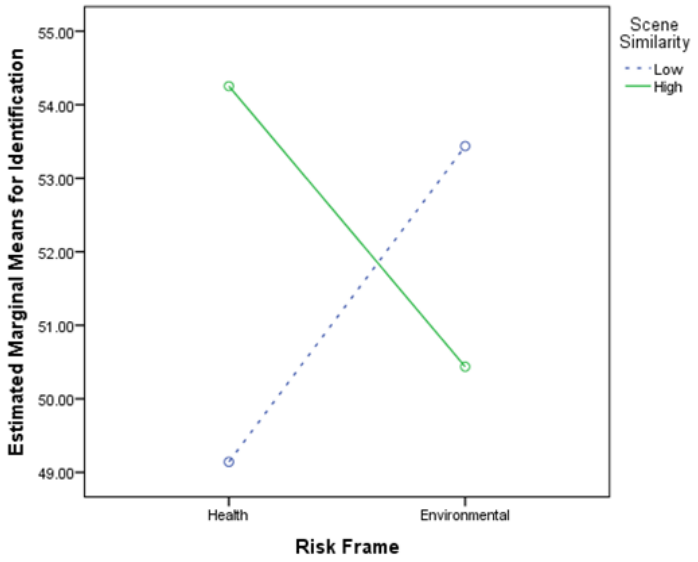


Figure 1. Interaction between risk frame and scene similarity for identification.

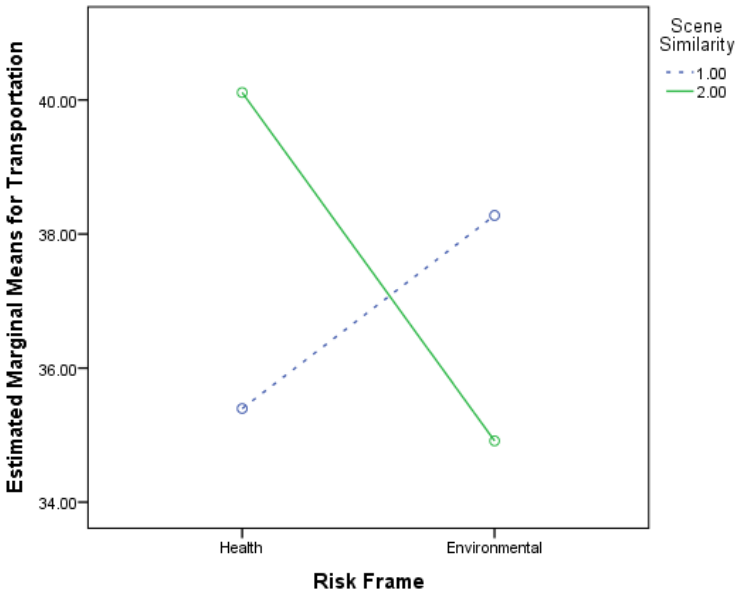


Figure 2. Interaction between risk frame and scene similarity for transportation.

There was no risk frame × scene similarity interaction for self- referencing, F (1, 534) = 1.756, p = .186, nor was there any risk frame × demographic similarity interaction for any of the narrative persuasion variables: identification, F (1, 534) = .214, p = .644; transportation, F (1, 534) = 2.145, p = .144; and self-referencing, F (1, 534) = 3.721, p = .054, which was almost significant at the .05 level.

There was an interaction between risk type and scene similarity for behavioral expectation to conserve water, F (1, 533) = 5.856, p = < .05, η^2=.008. (see Figure 3). Increasing scene similarity from low to high caused an increase in behavioral expectation to conserve water in the environmental frame condition, but a decrease in behavioral expectation in the health frame. Participants in the health frame—low scene similarity condition (M = 56.75, SE = 2.44) had the highest level of behavioral expectation to implement the recommendation, and those in the environmental frame—low scene similarity condition (M = 45.84, SE = 2.43) had the lowest level of behavioral

expectation.

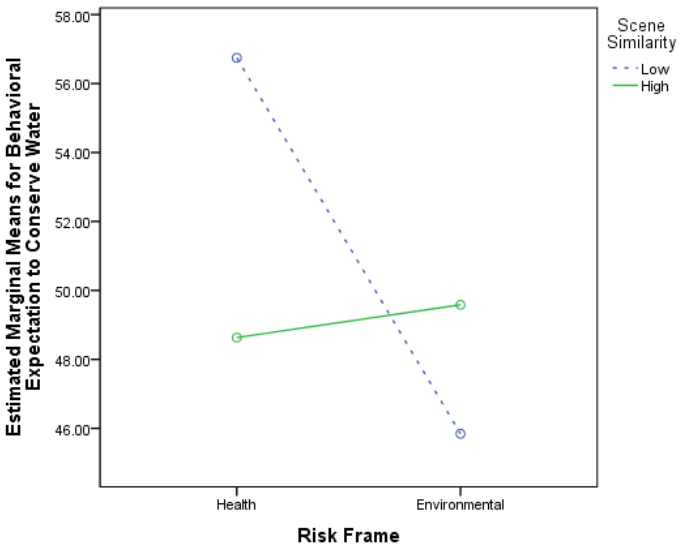


Figure 3. Interaction between risk frame and scene similarity for behavioral expectation to conserve water.

There was no interaction between risk type and scene similarity for behavioral expectation to seek information within one week of reading the message, F (1, 532) = 0.214, p = .644, or whenever there was time, F (1, 532) = 1.228, p = .268. Furthermore, there was no interaction between risk frame and either type of similarity for behavioral intention regarding any of the recommendations. For demographic similarity: conserve water, F (1, 532) = 3.106, p = .079); seek information within one week, F (1, 531) = 0.350, p = .554, and seek information when there is time, F (1, 534) = 0.084, p = .772. And, for scene similarity: conserve water, F (1, 532) = 3.448, p = .064; seek information within one week, F (1, 531) = 0.449, p = .503, and seek information when there is time, F (1, 534) = 0.074, p = .786.

There were also no additional interactions for any of the other outcome variables. Regarding risk perception, there was no interaction between risk frame and either type of

similarity, demographic similarity, F (1, 534) = .097, p = .756, or scene similarity, F (1, 534) = .515, p = .473, in terms of susceptibility. And in terms of severity, there was also no interaction between risk frame and either type of similarity: demographic similarity, F (1, 534) = 2.139, p = .144, or scene similarity, F (1, 534) = .701, p = .403, for severity.

H4. A three-way interaction (risk frame × demographic similarity × scene similarity) was predicted for susceptibility, severity, behavioral intention, behavioral expectation, identification, transportation, and self-referencing. This hypothesis was not supported: susceptibility, F (1, 534) = 004, p = .953; severity, F (1, 534) = 1.191, p = .276; identification, F (1, 534) = .921, p = .338; transportation, F (1, 534) = .677, p = .411; and self-referencing, F (1, 534) = 1.225, p = .269. There was also no three-way interaction for either of the risk perception variables: F (1, 534) = .004, p = .953 for susceptibility, and F (1, 534) = 1.191, p = .276 for severity. Additionally there was no three-way interaction for behavioral intention for any of the recommendations: conserve water, F (1, 532) = 2.474, p = .116; seek information within one week, F (1, 531) = 3.170, p = .076, and seek information when there is time, F (1, 533) = .184, p = .668. There was also no three-way interaction for behavioral expectation for any of the recommendations: conserve water, F (1, 533) = .651, p = .420; seek information within one week, F (1, 532) = 0.293, p = .588, and seek information when there is time, F (1, 534) = .481, p = .488.

Research Questions

RQ1. Research question 1 asked whether there was any demographic similarity × scene similarity interaction for any of the outcome variables, without the effect of framing. That interaction occurred in the case of severity, F (1, 534) = 5.062, p = < .05,

η^2=.006 (see Figure 4) and in the case of *perceived* demographic similarity, F (1, 534) = 28.394, p = < .001, η^2=.034 (see Figure 5). When demographic similarity was low, increasing scene similarity from low to high led to an increase in severity, M = 68.67, SE = 1.47 for low scene similarity, and M = 70.95, SE = 1.38 for high scene similarity), however when demographic similarity was high, increasing scene similarity from low to high led to a decrease in severity (M = 69.91, SE = 1.39 for low scene similarity, and M = 65.71, SE = 1.52 for high scene similarity).

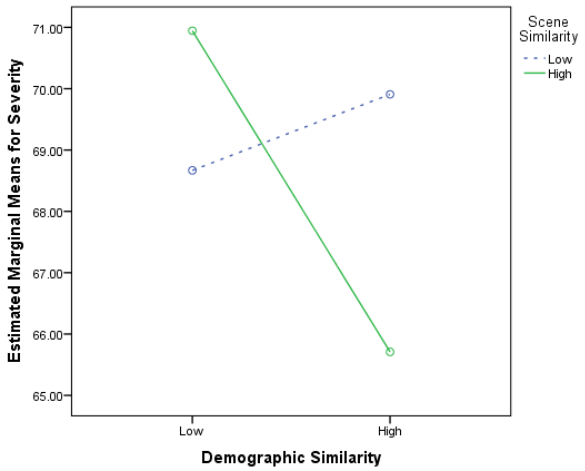


Figure 4. Interaction between demographic similarity and scene similarity for severity.

As shown in Figure 5, increasing scene similarity from low to high led to an increase in *perceived* demographic similarity for the high demographic similarity treatment group (M = 44.70, SE = 1.56 for low scene similarity, and M = 59.21, SE = 1.70 for high scene similarity), but to a marginal decrease in perceived demographic similarity for the low demographic similarity treatment group (M = 30.02, SE = 1.65 for low scene similarity, and M = 27.36, SE = 1.54 for high scene similarity).

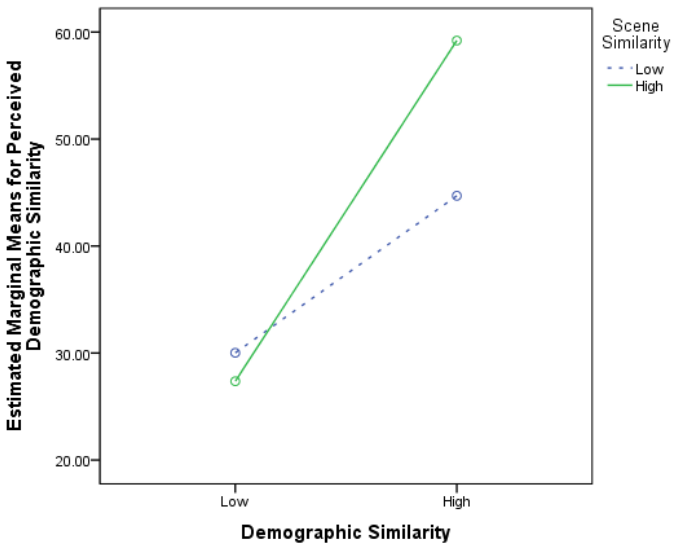


Figure 5. Interaction between demographic similarity and scene similarity for *perceived* demographic similarity.

RQ2. Research question 2 asked about the effects of the independent variables (individually and jointly) on *perceived* demographic similarity and *perceived* scene similarity, which are not to be confused with the manipulated versions of demographic and scene similarity.

Individual effects. There was a main effect for risk frame on perceived scene similarity, F (1, 534) = 5.971, p = < .05, η^2=.007, but not on perceived demographic similarity, F (1, 534) = 1.070, p = .301. Participants who read the health-framed message (M = 44.94, SE = 1.13) perceived a greater level of scene similarity than those who read the environmental-framed one (M = 41.11, SE = 1.08). Additionally, there was a main effect for demographic similarity on perceived scene similarity, F (1, 534) = 26.326, p = < .001, η^2=.032; participants perceived a higher level of scene similarity when demographic similarity was high (M = 47.04, SE = 1.12) as opposed to low (M = 39.01, SE = 1.09). Alternately, there was a main effect for scene similarity on perceived

demographic similarity, F (1, 534) = 13.447, p = < .001, η^2=.016; participants perceived a higher level of demographic similarity when scene similarity was high (M = 43.29, SE = 1.15) as opposed to low (M = 37.36, SE = 1.13).

Joint effects. There was risk frame × demographic similarity interaction for *perceived* demographic similarity, F (1,534) = 5.813, p < .05, η^2=.007, but not for *perceived* scene similarity, F (1,534) = 0.000, p = .986. Moving from low to high demographic similarity resulted in an increased level of perceived demographic similarity for the health frame condition (M = 27.59, SE = 1.63 for low demographic similarity, and M = 54.73, SE = 1.66 for high demographic similarity), as well as the environmental condition (M = 29.80, SE = 1.56 for low demographic similarity; and M = 49.18, SE = 1.60 for high demographic similarity), however the increase in perceived demographic similarity was greater for the health frame. There was no risk frame × demographic similarity (see Figure 6).

There was a demographic similarity × scene similarity × risk frame interaction for *perceived* scene similarity, F (1,534) = 5.602, p < .05, η^2=.007, but not for perceived demographic similarity, F (1,534) = 0.106, p = .745. As shown in Figure 7 in the graph on the left, for the low demographic similarity condition, increasing scene similarity from low to high led to an increase in *perceived* scene similarity for both the health frame and the environmental frame conditions, however the increase was marginally greater in the health condition. However as shown in Figure 7 in the graph on the right, for the high demographic similarity condition, although increasing scene similarity from low to high led to an increase in perceived scene similarity for both the health frame and the environmental frame conditions, the increase was marginally greater for the

environmental frame.

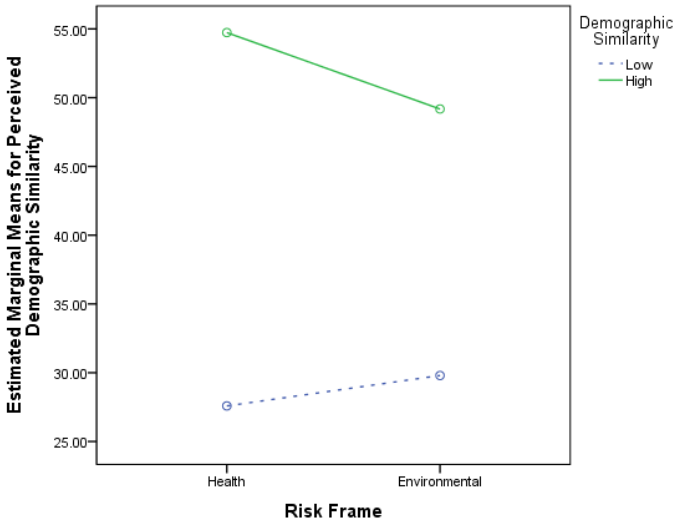


Figure 6. Demographic similarity × risk frame interaction for *perceived* demographic similarity.

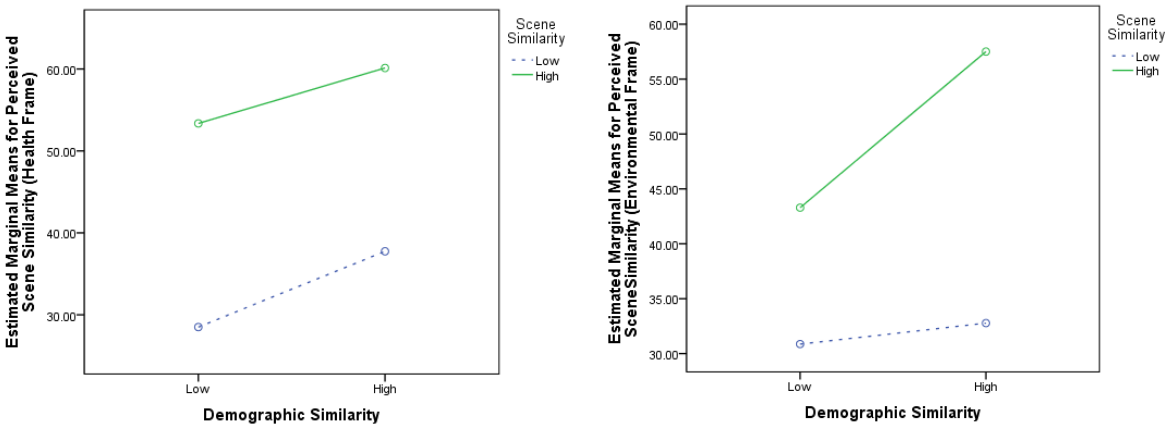


Figure 7. Demographic similarity × scene similarity × risk frame interaction for *perceived* scene similarity; the health frame condition is on the left, and the environmental frame

Supplemental Analyses: Effects of Personal Relevance on Outcomes

As shown in Table 10, personal relevance was a significant covariate in the

ANCOVA analyses for all dependent variables except perceived scene similarity. The importance of personal relevance in risk perception, behavior related, and narrative persuasion outcomes is also evident in Table 7, which reveals that it has a robust and positive bivariate correlation with most of the outcomes of interest. Because of its robust relationship with the dependent variables, I wanted to further assess the power of personal relevance in determining the outcomes central to this dissertation. I took the continuous personal relevance measure and split the sample by employing a median split (median = 47.31; low ≤ 47.31, high > 47.31). This dichotomized measure was entered into the ANOVA model with the other independent variables, with each dependent variable analyzed separately. Those results are presented next. Estimated marginal means for the personal relevance × risk frame × demographic similarity × scene similarity ANOVA model are found in Appendix I.

Independent effects. There was a main effect for personal relevance on risk perception variables: susceptibility, F (1,552) = 179.251, $p < .001$, η^2 =.237, and severity, F (1,552) = 103.186, $p < .001$, η^2=.154. Participants for whom personal relevance was high (M = 50.48, SE = 1.30) perceived a greater level of susceptibility than participants for whom personal relevance was low (M = 26.08, SE = 1.27). And, participants for whom personal relevance was high (M = 77.34, SE = 1.16) perceived a higher level of severity than participants for whom personal relevance was low (M = 60.88, SE = 1.13).

Personal relevance also influenced narrative persuasion processes. There was a main effect for personal relevance on identification, F (1,552) = 55.794, $p < .001$, η^2=.090, such that there was a greater level of identification for participants in the high personal relevance condition (M = 58.58, SE = 1.27) than in the low personal relevance

condition (*M* = 45.36, *SE* = 1.24). There was also a main effect for personal relevance on transportation, *F* (1,552) = 126.276, $p < .001$, η^2=.180, such that there was a greater level of transportation for participants in the high personal relevance condition (*M* = 47.09, *SE* = 1.21) than in the low personal relevance condition (*M* = 28.11, *SE* = 1.18). Additionally, there was a main effect for personal relevance on self-referencing, *F* (1,552) = 132.676, $p < .001$, η^2=.188, such that participants in the high personal relevance condition (*M* = 42.42, *SE* = 1.21) did more self referencing than participants in the low personal relevance condition (*M* = 22.93, *SE* = 1.18).

The behavior-related outcome variables were also influenced by personal relevance. There was a main effect for personal relevance on behavioral intention for each recommendation: conserve water, *F* (1,550) = 88.215, $p < .001$, η^2=.129; seek information within one week of reading the message, *F* (1,549) = 112.373, $p < .001$, η^2= .167, and seek information whenever there is time, *F* (1,551) = 133.086, $p < .001$, η^2= .191. There was also a main effect for personal relevance on behavioral expectation for each recommendation: conserve water, *F* (1,551) = 76.340, $p < .001$, η^2=.117; seek information within one week of reading the message, *F* (1,550) = 136.508, $p < .001$, η^2= .197, and seek information whenever there is time, *F* (1,551) = 136.026, $p < .001$, η^2= .196. Additionally, there was a main effect for personal relevance on response efficacy for each recommendation: conserve water, *F* (1,547) = 64.093, $p < .001$, η^2=.103; seek information within one week of reading the message, *F* (1,550) = 72.597, $p < .001$, η^2= .110, and seek information whenever there is time, *F* (1,550) = 85.216, $p < .001$, η^2= .127. Estimated marginal means for each treatment group are found in Table 9.

Table 9

Estimated Marginal Means Showing Main Effect of Personal Relevance on Behavior-Related Variables

		High personal relevance		Low personal relevance	
		Mean	Std. Error	Mean	Std. Error
Behavioral intention	Conserve water	70.172	1.653	48.487	1.612
	Seek information within one week	43.432	1.670	18.694	1.630
	Seek information when there is time	51.037	1.696	23.636	1.663
Behavioral expectation	Conserve water	61.831	1.824	39.554	1.781
	Seek information within one week	38.077	1.567	12.462	1.533
	Seek information when there is time	44.917	1.711	17.002	1.674
Response efficacy	Conserve water	73.014	1.769	53.236	1.725
	Seek information within one week	49.634	1.845	27.647	1.804
	Seek information when there is time	50.349	1.792	27.217	1.752

Joint effects. There was a personal relevance × risk frame interaction for behavioral intention to conserve water, F (1, 550) = 4.574, $p < .05$, η^2=.007). As shown in the graph on te left in Figure 8, increasing the level of personal relevance from low to high increased behavioral intention in both the health frame and environmental frame conditions, however the increase in the environmental frame was larger. In the health frame, there was an increase in behavioral intention from M = 56.35 (SE = 2.28) for low personal relevance to M = 73.10 (SE = 2.42) for high personal relevance, and in the case of the environmental frame, there was an increase in behavioral intention from M = 40.62 (SE = 2.28) personal relevance to M = 67.25 (SE = 2.25) for high personal relevance. The graph on the right in Figure 8 also shows the same interaction from a different perspective, that is, when personal relevance is low, framing has a greater effect on behavioral intention than when personal relevance is low rather than high; that is,

switching from an environmental frame to a health frame leads to a greater increase in behavioral intention when personal relevance is low, rather than high. This perspective is reinforced by the steepness of the slopes in the graph on the left, which shows that the low personal relevance line is steeper than the high personal relevance line.

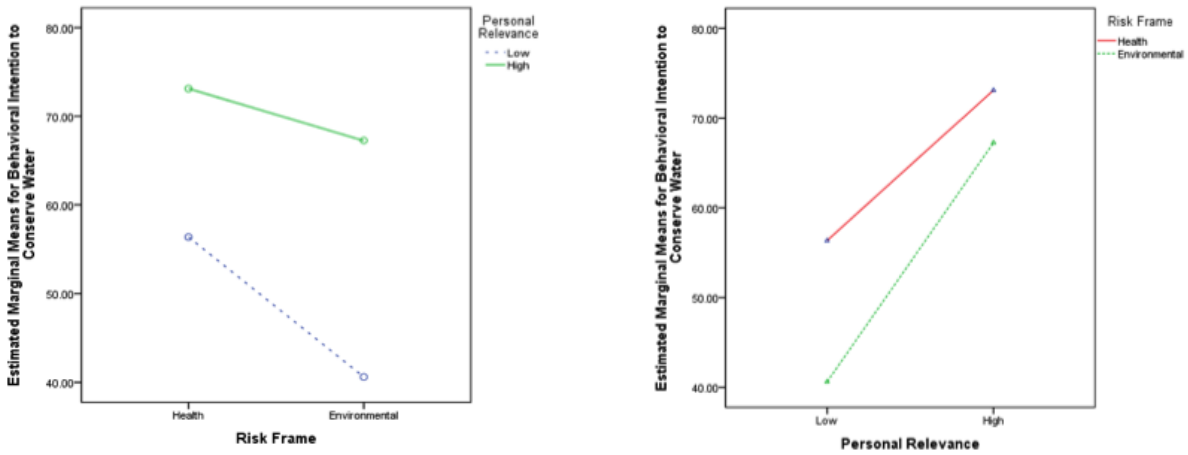


Figure 8. Interaction between personal relevance and risk frame for behavioral intention to conserve water, with each graph showing the interaction from a different perspective.

There was a personal relevance × scene similarity interaction for behavioral expectation to conserve water, F (1,551) = 5.185, $p < .05$, η^2=.008). As shown in graph on the left in Figure 9, when personal relevance is low, increasing the scene similarity from low to high resulted in a decrease in behavioral expectation to conserve water, M = 44.20 (SE = 2.53) to M = 34.91 (SE = 2.50), but there was negligible change in behavioral expectation when personal relevance was high, M = 60.67 (SE = 2.52) to M = 63.00 (SE = 2.63).

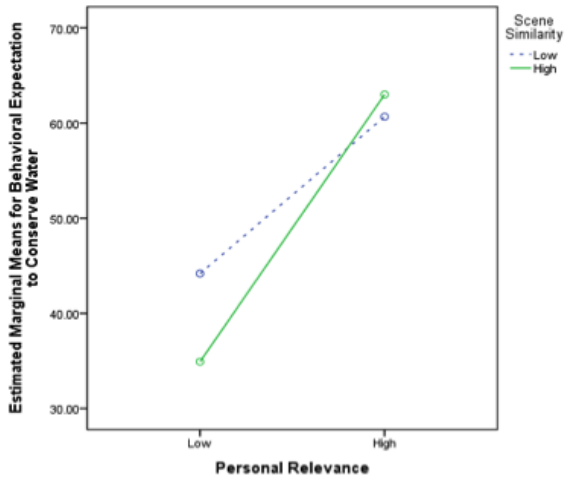


Figure 9. Interaction between personal relevance and scene similarity for behavioral expectation to conserve water, with each graph showing the interaction from a different perspective.

Table 10

Effects of Covariates in 2 x 2 x 2 ANCOVA for the Main Study & Adjusted R^2 of the Overall Models

	df1 numer-ator	df2 denom-inator	Personal Relevance			Optimistic Bias			Attitude toward Climate Change			Model Adj. R^2
			F	Sig.	η^2	*F*	Sig.	η^2	*F*	Sig.	η^2	
Susceptibility	1	534	185.434	.000	.176	70.086	.000	.067	44.869	.000	.043	.483
Severity	1	534	187.089	.000	.218	24.586	.000	.029	25.066	.000	.029	.366
Self-Referencing	1	534	147.149	.000	.173	22.346	.000	.026	15.109	.000	.018	.359
Identification	1	534	59.384	.000	.088	.012	.912	.000	23.299	.000	.034	.198
Transportation	1	534	138.040	.000	.175	3.139	.077	.004	13.815	.000	.018	.309
Perceived Demographic Similarity	1	534	10.485	.001	.013	22.116	.000	.027	0.669	.414	.000	.348
Perceived Scene Similarity	1	534	2.459	.117	.005	54.676	.000	.067	0.209	.648	.000	.336
Behavioral Intention-1	1	532	116.663	.000	.154	5.967	.015	.008	13.010	.000	.017	.284
Behavioral Intention-2	1	531	143.756	.000	.196	.043	.835	.000	1.582	.209	.002	.262
Behavioral Intention-3	1	533	181.465	.000	.235	1.678	.196	.002	2.944	.087	.004	.298
Behavioral Expectation-1	1	533	109.409	.000	.153	5.513	.019	.000	9.843	.002	.014	.242
Behavioral Expectation-2	1	532	138.300	.000	.189	.165	.685	.000	4.259	.040	.006	.260
Behavioral Expectation-3	1	534	131.053	.000	.180	.046	.831	.000	5.287	.022	.007	.254
Response Efficacy-1	1	530	75.566	.000	.113	11.821	.001	.018	10.884	.001	.016	.192
Response Efficacy-2	1	533	87.538	.000	.123	1.376	.241	.002	7.628	.006	.011	.236
Response Efficacy-3	1	533	90.692	.000	.127	.838	.360	.001	9.027	.003	.013	.238

Chapter 5: Discussion

Summary of Results

Recall that the main argument of this dissertation is that because health and environmental risks are different and are perceived as such, messages about risks that can threaten both health and the environment can be framed as either a health risk or an environmental risk as a means of altering perceptions about the risk. More importantly, all things being equal, a particular set of message features will achieve different results depending on which message frame is used. As a means of investigating this claim, two types of similarity (demographic similarity and scene similarity) were manipulated in messages about drought framed as either a health or an environmental risk. A 2 (risk frame: health, environmental) × 2 (demographic similarity: high, low) × 2 (scene similarity: high, low) between subjects design was used.

Main effects. It was hypothesized that, all things being equal, risk perception (susceptibility and severity), narrative persuasion processes (identification, transportation, self-referening), and behavior-related variables (behavioral intention, behavioral expectation, and response efficacy) would be greater when the risk was framed as a health risk than when it was framed as an environmental risk. This hypothesis was supported only in the case of behavioral intention and behavioral expectation to conserve water; people had greater intentions and expectations to adopt this recommendation when the risk threatened personal health as opposed to when it threatened the environment. Although the hypothesis was not supported for the risk perception variables, finding a statistically significant effect for behavioral intention (and expectation) is encouraging

because intention is considered a more direct predictor of behavior change than attitudinal variables such as risk perception are (see Sheppard, Hartwick, & Warshaw, 1988). Interestingly, people who read the environmental-frame message perceived a statistically significantly greater level of susceptibility to the risk than those who read the health-frame; this was unexpected given that people tend to feel more vulnerable when the risk threatens personal health as opposed to environmental health (e.g., Kahlor et al., 2006). One possibility for this unexpected result could be that participants in the health frame condition perceived the risk (contracting *Cryptosporidiosis*, a serious and potentially fatal waterborne disease) as extreme. However the threat of contracting *Cryptosporidiosis* during or after a drought is not improbable; in 1993 this disease was blamed for the death of 69 and the sickening of 403, 000 residents of greater Milwaukee at a reported cost of $96.2 million (Corso et al., 2003).

There were no main effects for demographic similarity on the dependent variables, suggesting that as a message feature this variable may not be an important independent predictor of risk perception, narrative persuasion processes, or behavior-related variables. Scene similarity did not fare very well either as an independent predictor of risk perception, but high scene similarity did lead to a statistically significantly greater level of self-referencing and behavioral intention to conserve water than low scene similarity.

Interaction effects. The two-way interactions provided a way to test the strength of the argument that the level (high vs. low) of demographic and scene similarity operate differently in health-frame messages than they do in environmental-frame messages. On the one hand, a risk frame × demographic similarity interaction was expected to show

that increasing the demographic similarity from low to high in the health frame leads to greater levels of the dependent variables when compared with low to high increases in the environmental frame. This was, however, not the case. On the other hand, it was expected that scene similarity would have a greater effect on dependent variables when the risk was framed as an environmental threat than when it was a health threat. This was, however, not the case; instead, scene similarity from low to high lead to greater amount of change in identification and transportation when the risk was framed as a health threat.

The manner in which scene similarity interacted with risk frame has implications for narrative persuasion, particularly as it concerns identification and transportation. Although narratives persuasion processes seem to center on the characters in the story (see the items for related scales in Appendix D), the results show that the scene matters such that all things being equal, people will engage in greater levels of identification and transportation for a health risk when the scene similarity is high rather than low, and they will engage in greater levels of identification and transportation for an environmental risk when the scene similarity is low rather than high.

The pattern in the risk frame × scene similarity interaction on identification and transportation (see Figures 1 and 2) raises the issue of risk-relevant similarity as discussed in Chapter 2 (see Simons et al., 1970). It could be that when drought was framed as environmental risk that participants perceived the risk as being more relevant to a rural scene, which was the depiction in the low scene similarity condition. It appears therefore that in addition to the common attitude that environmental risks occur somewhere else, for example in distant places (see Leiserowitz, 2005, 2007), people may also perceive environmental risks to occur in different places, in other words, not only

does proximity matter, but similarity as well. Recall that the manipulation check showed that participants perceived the urban scene to be more similar to their own locale than the rural scene. Note, that as shown in Figures 1 and 2, that although participants engaged in the highest levels of identification, and transportation when the risk was framed as a health threat and the scene similarity was high (urban setting), they also engaged in a relatively high level of identification and transportation when the risk was an environmental risk but only when the scene similarity was low (rural setting). The notion of risk-relevance should therefore be investigated from the perspective of the message receivers because although risk communicators may consider that a particular environmental risk is relevant to a particular setting (e.g., an urban setting), the audience may think that it is more relevant to a different setting (e.g., a rural setting).

Covariate effects. The relatively large effect sizes associated with personal relevance as a covariate in the various analyses support Kahlor et al.'s (2006) claim that one of the reasons members of the public do not readily engage in recommended behaviors to mitigate climate change and related risks (drought is considered a related risk) is that they do not find them to be personally relevant. Attitude toward climate change was also shown to be an important covariate, though with much smaller effect sizes that personal relevance. Optimistic bias was a significant covariate in some cases, but less often that climate change attitude (see Table 10). It is possible, however, that with a better measure of optimistic bias, its role as a covariate could be greater.

Implications and Future Research Directions

Scene similarity. One of the more significant contributions this dissertation makes is highlighting the need to consider place-related contextual matters in risk

communication in the form scene similarity. There were more significant effects involving scene similarity than involving demographic similarity, and this suggests a great opportunity for the extension of the literature on similarity as a persuasive feature in messages. One of the challenges of such research would be to determine which aspects of the scene can be highlighted to achieve the largest desired effect, and more importantly, when, how, and for whom scene similarity could and should be optimized. Research on scene similarity may be particularly relevant when it comes to communication, mitigation, and adaptation of climate change and related risks.

Additional research on how scene similarity influences identification and transportation, and possibly other narrative persuasion variables (e.g., parasocial interaction), can also be pursued as it may open new possibilities for entertainment education, which has traditionally used demographic similarity in telenovelas to increase risk perception about health risks. The results also suggest that scene similarity can be used to leverage the effect of demographic similarity and vice versa. In other words, participants were likely to see themselves as being more similar to characters in a narrative. Likewise, participants considered their environment to be more similar to the environment in a story if the people in the story are also similar to them, a finding that may be of interest to practitioners who seek to highlight risks to the environment.

Risk-relevant similarity. Future research should also approach the issue of risk-relevant similarity from the point of view of the audience. According to O'Keefe (2002), the influence of similarity on persuasive outcomes is complex and depends on the relevance of the similarity, the message content, and contextual factors. Although it may seem reasonable to suspect that demographic similarity is more relevant to health risks

and scene similarity than to environmental risks, this was not shown to be the case. Framing an environmental risk as a health risk may not negate long-standing attitudes that environmental risks primarily affect places rather than people, and therefore scene similarity may remain more influential than demographic similarity in environmental risk messages, even when these messages are framed in a health context.

Research on scene similarity is also relevant in this suggested message framing—narrative persuasion link because, as reported in the results section, framing an environmental risk as a health risk can lead to increased identification and transportation when high scene similarity in also included in the message.

Framing environmental risks as threats to health. Several calls have been made to find ways that make environmental risks more personally relevant to target audiences by using a health approach to environmental risk communication (see for example, Frumkin et al., 2008; Semenza et al., 2011). This dissertation supports such calls because its results indicate that such an approach may be a way to engender attitude and behavior change. Additionally, this dissertation research showed possible linkages between studies on message framing and those on narrative persuasion processes.

Connections with other research lines. Research on demographic and scene similarity in risk communication may have connections with existing research on psychological closeness, which suggests that people can feel close to others in similar situations regardless of proximity (see Carvalho et al., 2008). Research on place identification and place attachment, and other psychosocial and psychospatial models and theories, may also be relevant to studies on demographic and scene similarity (see Gattig & Hendrickx, 2007).

Underlying dimensions of risk perception. Future studies should seek to better understand the different results among the different treatment groups (i.e., different combinations of scene similarity, demographic similarity, and risk-frame). I argue that the differences in the treatment groups are related to the underlying dimensions of risk perception, specifically that risk perception may be based on perceptions of self and other. Investigating the why of the results should be a priority in the next steps of the research presented in this dissertation. Factor analysis of the Pilot Study 1 data showed a two-factor model for the eight risks in the Pilot 1 survey; six risks (drought, flood, heat wave, high pollen count, tornado, and West Nile Virus) loaded highly on Factor 1 but not on Factor 2, whereas the other two risks (global warming and climate change) loaded highly on Factor 2 and not on Factor 1. A two-factor model also emerged for the different characteristics of risks such that the self-related items (e.g., susceptibility, personal relevance, extreme harm) loaded highly onto Factor 1 but not on Factor 2, whereas target of the threat (the people in other countries and environment more than people) and abstractness loaded highly onto Factor 2 but not on Factor 1.

Though given little attention in this dissertation, the factor analysis of the Pilot Study 1 data suggests that it may be possible that risk perceptions can vary on dimensions of self and other; this research should be pursued, perhaps beginning with the creation of scales to measure the concepts of self and other. Such research can inform a replication of this dissertation research in that risks that load highly on one factor can be compared with risks that load highly on another factor; this may make for greater differences among treatment groups and therefore greater effect sizes. Additionally because health and environmental risks have different characteristics, they may load differently on the

underlying dimensions of risk perception therefore making them well-suited to research that compares message features that may vary on those same dimensions.

Studies regarding the underlying dimensions of risk perception should also seek to make connections with existing research in that area, for example research that indicate differences in attitude as it relates to perceptions of local and global risks. It is reasonable to assume that judgments about local risk may be a proxy for perceptions of risk-to-self whereas judgments regarding global risk may be a proxy for perceptions of risk-to-other; such relationships should be tested empirically.

Behavior-related variables. More work on behavioral expectation should also be pursued. As shown in some of the analyses of the results, in general, estimated group means for behavioral expectation were lower than those for behavioral intention, and there were cases in which there were significant effects on behavioral intention but not on behavioral expectation, and vice versa. For example, there was a statistically significant main effect for scene similarity on behavioral intention but not on behavioral expectation, and there was a statistically significant risk frame × scene similarity interaction for behavioral expectation but not behavioral intention. This raises the question of using behavioral intention as a precursor of behavior; perhaps behavioral expectation may be a better predictor of actual behavior. Future studies on the effects of risk messages and interventions that use attitude-behavior theories such as the Theory of Reasoned Action (Fishbein & Ajzen, 1975) or the Theory of Planned Behavior (Ajzen, 1985) should consider including behavioral expectation as an additional direct predictor of behavior (see Sheppard, Hartwick, & Warshaw, 1988).

Limitations and Related Recommendations

Instrumentation. Although optimistic bias was shown to be a significant covariate in most of the analyses, it was measured using difference scores between only two items, likelihood of risk to self, and' likelihood of risk to a different other. Even though this is one of the traditional ways of measuring optimistic bias, in the future, participants can be asked to indicate their perceived susceptibility using the revised Risk Behavior Diagnostic (RBD) scale (Witte, McKeon, Cameron, & Berkowitz, 1995) used in this dissertation, for both the self, and an average other. The difference scores between both scale indices can then be used as a measure of optimistic bias, and this may be more informative because it would be based on more than one item. The behavior related variables (behavioral intention, behavioral expectation, response efficacy) were also assessed as single items as opposed to creating an index from all of the recommended behaviors. It was felt that a behavioral index would be best if the behavioral recommendations related to one specific behavior (see Sheppard, Hartwick, & Warshaw, 1988). Creating a behavioral index that included both information seeking and water conservation items would not have been ideal because those two behaviors are different. In future studies however several items should be used to assess intentions, expectations, and response efficacy for a specific behavior.

Violation of data analysis assumptions. Although analysis of covariance is intended to increase the power of hypothesis testing by removing the effects of other influences on the dependent variables, it is suggested that covariates be tested before the study treatment is given. When covariates are measured after the treatment is given, they

may be affected by the treatment and, therefore, when they are removed, some of treatment effects may also be removed (Pallant, 2010).

Implications for practitioners

The results of the main study indicate that framing an environmental risk as a health risk can change behavioral intentions, as well as behavioral expectations. It is important to note also that the behavioral recommendation for which the health frame showed significant effects was conserving water now, rather than in the future. This is encouraging for risk communication that deals with environmental risks like drought that may not seem immediate. Of the eight risks studied in Pilot 1, drought ranked fifth in terms of having immediate consequences, after, tornado, flood, West Nile Virus, and heat wave. It shows that people may be willing to make immediate changes to prevent a risk perceived as relatively distant if they can be convinced that the risk affects their health, as opposed to the environment.

In addition to paying more attention to the way a risk is framed, practitioners should also pay attention to the places in which characters are portrayed. The results also showed that in narratives about environmental risks, the places may be more important than people portrayed in the story in getting people to make connections between themselves and events in the narrative (self-referencing), as well as in engendering desired behavioral intentions. This is evident in the overall lack of significant effects for demographic similarity (even when the risk was framed as a health risk). At the same time however high scene similarity resulted in greater self-referencing and behavioral intention to conserve water than low scene similarity. Furthermore, the interaction effects on narrative persuasion processes involved scene similarity, rather than demographic

similarity. The results showed that the effect of the risk frame (health versus environment) on identification and transportation depends on the level of scene similarity in the story. Health frames worked better when scene similarity was high (in this case, an urban setting), and environmental frames worked better when scene similarity was low (in this case, a rural setting), perhaps because drought, when framed as an environmental risk, was associated with a rural scene.

6

The supplemental analyses highlight the importance of personal relevance in risk communication. Personal relevance independently increased the level of every outcome variable in a statistically significant manner, with medium effect sizes. Importantly, the effect of personal relevance on perceived susceptibility showed the largest effect size (η^2 =.237) when compared to the effect of personal relevance on the other outcome variables. As shown in Figure 8, the interaction between personal relevance and risk frame for behavioral intention to conserve water revealed that framing an environmental risk as a health risk leads to a better outcome when personal relevance is low, rather than high. This result is encouraging, particularly for environmental risk communicators, because it provides some evidence that behavioral outcomes can be improved by framing perceived impersonal risks (i.e., those of low personal relevance) as health risks. However because the effect size for this result was small (η^2=.007), it will worthwhile to conduct further research on the interaction between personal relevance and risk frames, perhaps using other perceived impersonal risks such as global warming, sea level rise, and other risks associated with the broader problem of climate change.

Figure 9 shows that when personal relevance is high, the expectation to conserve water was relatively high regardless of the scene, however when personal relevance is low, behavioral expectation to conserve water is higher for low scene similarity (i.e., a rural setting) than for a high scene similarity (i.e., an urban setting). For narrative risk communicators who are trying to raise awareness about drought in an urban setting, and who are trying to engender water conservation practices in that setting, this result suggests that increasing the personal relevance of the risk may serve to increase behavioral expectation but making the scene in the story seem more urban may not be the best way to increase personal relevance because it appears that the need for action is being associated with rural (as opposed to urban) settings.

More research on the interaction between depictions of place and personal relevance is needed because the results may be different for other risks. Additionally, as discussed earlier in this chapter, the perceived relevance of a risk setting should also be studied. In other words, practitioners would be well-served if they had a better idea of when to increase the similarity of the place in the message, and when to decrease it. Figure 9 suggests that when personal relevance is low, it may be better to make the setting seem more like the perceived settings that people stereotype as being susceptible to drought. Weinstein's (1980) ideas about the role of stereotype salience in risk perception may be relevant here; he stated that people have a stereotype of whom a risk affects and the more different from the stereotype they perceive themselves to be, the less likely they are to feel susceptible to the risk, because of optimistic bias. It is possible however that the ideas of stereotype salience is not only relevant to people, but also to places.

Conclusion. This dissertation has several important lessons. First**,** context matters, particularly scene similarity, and this finding may have implications for various related lines of research including narrative risk communication, entertainment education, and similarity research as it relates to message effects. Second, message outcomes in the field of environmental communication may be enhanced if the messages are presented in a health context, which is connected to the challenge of helping audiences see and care about the inextricable link between humans and their environment. Such a link can be better made in research and practice when both risk communicators and practitioners take into consideration the centrality of risk perception to the outcomes of the messages that they deliver to their audiences. As long as risk communicators fail to understand the underlying dimensions on which people perceive risks, message effectiveness is likely to fall short of the desired mark. Criticisms of popular models used to assess risks perception include the contentions that they are not well-suited to assessing environmental risk perception and that when the correct data analyses methods are used, these models account for only 30–40% of the variance in risk perception (Sjöberg, 2004)[7]. Research on message effects (e.g., effects of risk frame and similarity effects) can benefit from a more thorough investigation into the underlying dimensions of risk perception; without a clearer understanding of the why behind people's risk perceptions (beyond current models), this dissertation (and others like it) may simply be contributing to salt passage research (see Pacanowsky, 1978).

Appendix A: Skewness and Kurtosis Values

Pilot 1: Skewness and Kurtosis Values (N = 171)

Variable	Skewness		Kurtosis	
	Statistic	Std. Error	Statistic	Std. Error
SEV_ClimateChange	-.476	.186	-.312	.369
SEV_Drought	-.377	.186	-.836	.369
SEV_Flood	-.471	.186	-.607	.369
SEV_GlobalWarming	-.794	.186	.159	.369
SEV_HeatWave	-.154	.186	-.546	.369
SEV_HighPollenCount	.481	.186	-.463	.369
SEV_Tornado	-.556	.186	-.747	.369
SEV_WestNileVirus	-.215	.186	-1.173	.369
SNC_ClimateChange	-.821	.186	-.256	.369
SNC_Drought	-1.296	.186	1.394	.369
SNC_Flood	-1.342	.186	1.801	.369
SNC_GlobalWarming	-1.372	.186	1.344	.369
SNC_HeatWave	-.548	.186	-.311	.369
SNC_HighPollenCount	.268	.186	-.814	.369
SNC_Tornado	-1.266	.186	1.361	.369
SNC_WestNileVirus	-.860	.186	-.072	.369
EH_ClimateChange	-.463	.186	-.714	.370
EH_Drought	-.920	.186	.530	.369
EH_Flood	-.876	.186	.647	.369
EH_GlobalWarming	-.920	.186	.222	.369
EH_HeatWave	-.539	.186	-.546	.369
EH_HighPollenCount	.451	.186	-.539	.369
EH_Tornado	-1.142	.186	.842	.369
EH_WestNileVirus	-.886	.186	.162	.369
LS_ClimateChange	-1.156	.187	.713	.371
LS_Drought	-.154	.186	-.648	.370
LS_Flood	-.152	.186	-.727	.370
LS_GlobalWarming	-1.590	.186	2.113	.370
LS_HeatWave	-.102	.186	-.664	.370
LS_HighPollenCount	.469	.186	-.592	.370
LS_Tornado	.113	.186	-.962	.370
LS_WestNileVirus	.077	.186	-1.068	.370

Variable	Skewness		Kurtosis	
	Statistic	Std. Error	Statistic	Std. Error
LA_ClimateChange	-.727	.186	-.636	.369
LA_Drought	.486	.186	-.643	.369
LA_Flood	.388	.186	-.394	.369
LA_GlobalWarming	-.845	.186	-.551	.369
LA_HeatWave	-.158	.186	-1.075	.369
LA_HighPollenCount	.063	.186	-1.334	.369
LA_Tornado	.507	.186	-.662	.369
LA_WestNileVirus	1.253	.186	.795	.369
RA_ClimateChange	-.701	.186	-.801	.369
RA_Drought	.480	.186	-.616	.369
RA_Flood	.503	.186	-.400	.369
RA_GlobalWarming	-.801	.186	-.601	.369
RA_HeatWave	-.009	.186	-1.121	.369
RA_HighPollenCount	.199	.186	-1.280	.369
RA_Tornado	.533	.186	-.679	.369
RA_WestNileVirus	1.238	.186	.804	.369
PA_ClimateChange	-.959	.186	-.367	.369
PA_Drought	-.090	.186	-1.293	.369
PA_Flood	-.047	.186	-1.130	.369
PA_GlobalWarming	-1.205	.186	.398	.369
PA_HeatWave	-.382	.186	-1.128	.369
PA_HighPollenCount	-.230	.186	-1.352	.369
PA_Tornado	.006	.186	-1.302	.369
PA_WestNileVirus	.640	.186	-.890	.369
EA_ClimateChange	-.179	.186	-1.153	.369
EA_Drought	.454	.186	-.602	.369
EA_Flood	.212	.186	-.562	.369
EA_GlobalWarming	-.540	.186	-.785	.369
EA_HeatWave	.177	.186	-.847	.369
EA_HighPollenCount	.475	.186	-1.008	.369
EA_Tornado	.365	.186	-1.012	.369
EA_WestNileVirus	.785	.186	-.493	.369
CI_ClimateChange	.608	.186	-.871	.369
CI_Drought	-.128	.186	-1.098	.369
CI_Flood	-1.096	.186	.157	.369
CI_GlobalWarming	.493	.186	-.991	.369
CI_HeatWave	-.472	.186	-1.022	.369
CI_HighPollenCount	-.165	.186	-1.228	.369

Variable	Skewness		Kurtosis	
	Statistic	Std. Error	Statistic	Std. Error
CI_Tornado	-1.484	.186	1.041	.369
CI_WestNileVirus	-.386	.186	-1.113	.369
PS_ClimateChange	-.148	.186	-1.505	.370
PS_Drought	.950	.186	-.220	.370
PS_Flood	1.029	.186	.011	.370
PS_GlobalWarming	-.771	.186	-.810	.370
PS_HeatWave	1.076	.186	.056	.370
PS_HighPollenCount	1.232	.186	.411	.370
PS_Tornado	1.134	.186	.019	.370
PS_WestNileVirus	.793	.186	-.726	.370
AB_ClimateChange	.194	.186	-1.429	.369
AB_Drought	.615	.186	-1.011	.369
AB_Flood	.797	.186	-.715	.369
AB_GlobalWarming	-.001	.186	-1.477	.369
AB_HeatWave	.806	.186	-.629	.369
AB_HighPollenCount	.603	.186	-1.110	.369
AB_Tornado	.823	.186	-.537	.369
AB_WestNileVirus	.288	.186	-1.368	.369
POC_ClimateChange	.498	.186	-1.126	.370
POC_Drought	-.657	.186	-.623	.370
POC_Flood	-.286	.186	-1.088	.370
POC_GlobalWarming	.513	.186	-1.179	.370
POC_HeatWave	-.489	.186	-.914	.370
POC_HighPollenCount	.555	.186	-.722	.370
POC_Tornado	.571	.186	-.893	.370
POC_WestNileVirus	-1.083	.186	.116	.370
EMP_ClimateChange	-.351	.186	-.854	.369
EMP_Drought	.278	.186	-.726	.369
EMP_Flood	.332	.186	-.776	.369
EMP_GlobalWarming	-.254	.186	-1.088	.369
EMP_HeatWave	.397	.186	-.655	.369
EMP_HighPollenCount	.754	.186	-.370	.369
EMP_Tornado	.404	.186	-.796	.369
EMP_WestNileVirus	1.519	.186	1.665	.369
PR_ClimateChange	-.245	.186	-1.415	.370
PR_Drought	.664	.186	-.821	.370
PR_Flood	.602	.186	-.835	.370
PR_GlobalWarming	-.529	.186	-1.129	.370

Variable	Skewness		Kurtosis	
	Statistic	Std. Error	Statistic	Std. Error
PR_HeatWave	.348	.186	-1.188	.370
PR_HighPollenCount	.442	.186	-1.220	.370
PR_Tornado	.691	.186	-.788	.370
PR_WestNileVirus	1.231	.186	.383	.370
WT_ClimateChange	-.639	.186	-1.091	.369
WT_Drought	.564	.186	-.996	.369
WT_Flood	.977	.186	-.056	.369
WT_GlobalWarming	-1.420	.186	1.200	.369
WT_HeatWave	1.168	.186	.468	.369
WT_HighPollenCount	1.356	.186	.891	.369
WT_Tornado	2.109	.186	3.951	.369
WT_WestNileVirus	.259	.186	-1.361	.369
Valid N (listwise)				

Pilot 2: Skewness and Kurtosis Values (N = 425)

	Skewness		Kurtosis	
	Statistic	Std. Error	Statistic	Std. Error
DS_1_ClassSim	.252	.118	-1.175	.236
DS_2_StatDif_REV	.193	.118	-1.105	.236
DS_3_EconDif_REV	.203	.118	-.861	.236
DS_4_BckgndSim	.423	.118	-.910	.236
DS_5_StatSim	.338	.118	-1.009	.236
DS_6_ClassDif_REV	.174	.118	-.990	.236
DS_7_EconSim	.293	.118	-.853	.236
DS_8_BckgndDif_REV	.318	.118	-.969	.236
DS_9_GeogSim	.509	.118	-.782	.236
DS_10_LotCmn	.450	.118	-.607	.236
SS_1_LivePlSimLive	.447	.118	-1.053	.236
SS_2_WorkDifClge_REV	.192	.118	-1.294	.236
SS_3_CmntySim	.347	.118	-1.032	.236
SS_4_ClgeDif_REV	.114	.118	-1.156	.236
SS_5_LivePlDifLive_REV	.308	.118	-1.013	.236
SS_6_WrkSimClge	.237	.118	-1.122	.236
SS_7_CmntyDif_REV	.280	.118	-.983	.236
SS_8_ClgeSim	.151	.118	-1.170	.236
SS_9_IdfyWrkSchEnv	-.021	.118	-1.052	.236
SS_10_IdfyResCmnty	.041	.118	-.939	.236
PERS_1_Compel	-.531	.118	-.463	.236
PERS_2_Persuasive	-.512	.118	-.500	.236
PERS_3_Convince	-.709	.118	-.071	.236
PERS_4_Sway	-.391	.118	-.549	.236
REI_Rtl_1_NoLikeThink_REV	-.333	.118	-.834	.236
REI_Rtl_2_AvdDeepThink_REV	-.524	.118	-.471	.236
REI_Rtl_3_PrfrChlnge	-.441	.118	-.207	.236
REI_Rtl_4_PrfrComplex	-.166	.118	-.626	.236
REI_Rtl_5_ThinkLtleSatis_REV	-.368	.118	-.623	.236
REI_Epl_1_TrstFeelings	-.727	.118	.207	.236
REI_Epl_2_TrstHunches	-.851	.118	.773	.236
REI_Epl_3_IntlImpRight	-.621	.118	.376	.236
REI_Epl_4_TrstGut	-.859	.118	.848	.236
REI_Epl_5_FeelRghtWrng	-.669	.118	.511	.236
PR_1_Importance	-.038	.118	-.911	.236
PR_2_Concern	-.079	.118	-.909	.236
PR_3_Relevance	.202	.118	-.821	.236

	Skewness		Kurtosis	
	Statistic	Std. Error	Statistic	Std. Error
PR_4_Meaning	-.003	.118	-.879	.236
PR_5_Triviality	.039	.118	-.555	.236
PR_6_Matters	.044	.118	-.807	.236
PR_7_Interest	.119	.118	-1.030	.236
PR_8_Significance	.104	.118	-.907	.236
SR_1_MeInMind	-.434	.118	-.924	.236
SR_2_RelateToMe	.095	.118	-.992	.236
SR_3_PersonalExp	-.247	.118	-1.115	.236
SR_4_OwnRisk	-.672	.118	-.486	.236
TR_1_Envision	-.804	.118	.074	.236
TR_2_LoseSelf	.080	.118	-.782	.236
TR_3_TuneOut_REV	.048	.118	-.954	.236
TR_4_EnvisionMe	-.047	.118	-.876	.236
TR_5_VividImgScen	-.281	.118	-.773	.236
TR_6_MentInv	-.220	.118	-.850	.236
TR_7_PutStoryOut_REV	.207	.118	-.616	.236
TR_8_PartOfStory	.545	.118	-.610	.236
TR_9_Impatient	.386	.118	-.812	.236
TR_10_Perspective	-.177	.118	-.645	.236
TR_11_EmotAffected	-.138	.118	-.872	.236
TR_12_VividImgChar	-.094	.118	-.841	.236
TR_13_OtherWays	.128	.118	-1.172	.236
TR_14_MindWanders_REV	.483	.118	-.633	.236
TR_15_WhatCharFelt	-.001	.118	-1.010	.236
TR_16_EvntsRelv	.658	.118	-.481	.236
TR_17_StoriesImpact	-.294	.118	-.656	.236
TR_18_IdentifyWChar	.255	.118	-.825	.236
TR_19_VividImgEvents	-.080	.118	-.998	.236
ID_1_Part	.574	.118	-.633	.236
ID_2_ForgotSelf	.575	.118	-.547	.236
ID_3_Understand	-.112	.118	-.816	.236
ID_4_GoodUndChar	-.441	.118	-.431	.236
ID_5_UndReasons	-.671	.118	.131	.236
ID_6_FeelEmotions	-.214	.118	-.974	.236
ID_7_InCharHeads	.103	.118	-.860	.236
ID_8_KnewExactly	.192	.118	-.916	.236
ID_9_Succeed	-.649	.118	-.489	.236
ID_10_JoyNSad	-.270	.118	-.844	.236

Main Study: Skewness and Kurtosis Values (N = 568)

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
SEV1	568	-.675	.103	-.269	.205
SEV2	568	-1.157	.103	1.057	.205
SEV3	568	-1.079	.103	.856	.205
SEV4	568	-.302	.103	-.838	.205
SUS1	568	.497	.103	-.651	.205
SUS2	568	.502	.103	-.641	.205
SUS3	568	.177	.103	-1.004	.205
SUS4	568	.564	.103	-.617	.205
PR1	568	.034	.103	-.942	.205
PR2	568	.031	.103	-.911	.205
PR3	568	.355	.103	-.832	.205
PR4	568	-.026	.103	-.786	.205
PR5	568	-.026	.103	-.598	.205
PR6	568	-.064	.103	-.879	.205
PR7	568	.158	.103	-.908	.205
PR8	568	.189	.103	-.875	.205
SR1	568	.822	.103	-.422	.205
SR2	568	1.092	.103	.422	.205
SR3	568	.523	.103	-.900	.205
SR4	568	.156	.103	-1.184	.205
CC1	568	-.312	.103	-.954	.205
CC2	568	.073	.103	-.954	.205
CC3	568	-.584	.103	-.558	.205
CC4	568	-.264	.103	-.930	.205
CC5	568	-.294	.103	-.779	.205
CC6	568	-.123	.103	-.857	.205
CC7	568	-.597	.103	-.590	.205
CC8	568	-.243	.103	-.871	.205
ID1	568	.850	.103	-.344	.205
ID2	568	.773	.103	-.528	.205
ID3	568	-.082	.103	-1.043	.205
ID4	568	-.428	.103	-.731	.205
ID5	568	-.536	.103	-.378	.205
ID6	568	-.026	.103	-.990	.205
ID7	568	.199	.103	-.917	.205
ID8	568	.292	.103	-.976	.205

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
ID9	568	-.664	.103	-.427	.205
ID10	568	-.179	.103	-1.027	.205
FR1	568	.520	.103	-.853	.205
FR2	568	.591	.103	-.705	.205
FR3	568	.197	.103	-1.128	.205
FR4	568	-.030	.103	-.998	.205
ANG1	568	1.077	.103	.167	.205
ANG2	568	.971	.103	-.125	.205
ANG3	568	-1.788	.103	2.396	.205
HPE3	568	1.164	.103	.308	.205
ANG4	568	1.052	.103	-.008	.205
HPE1	568	.865	.103	-.264	.205
HPE2	568	1.183	.103	.561	.205
HPE4	568	.905	.103	-.246	.205
REIr1	568	-.507	.103	-.764	.205
REIr2	568	-.800	.103	-.321	.205
REIr3	568	-.487	.103	-.349	.205
REIr4	568	-.152	.103	-.721	.205
REIr5	568	-.454	.103	-.733	.205
REIe1	568	-.540	.103	-.444	.205
REIe2	568	-.637	.103	-.089	.205
REe3	568	-.436	.103	-.425	.205
REIe4	568	-.580	.103	-.321	.205
REIe5	568	-.537	.103	-.516	.205
TR1	568	-.359	.103	-1.119	.205
TR2	568	.116	.103	-.986	.205
TR3	568	.099	.103	-.911	.205
TR4	568	-.117	.103	-.959	.205
TR5	568	.898	.103	-.097	.205
TR6	568	.522	.103	-.897	.205
TR7	568	.537	.103	-.798	.205
TR8	568	.298	.103	-1.073	.205
TR9	568	-.209	.103	-.979	.205
TR10	568	.454	.103	-.848	.205
TR11	568	.191	.103	-1.089	.205
PERS1	568	.159	.103	-.941	.205
PERS2	568	-.025	.103	-1.055	.205
PERS3	568	-.119	.103	-1.000	.205

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
PERS4	568	.093	.103	-1.010	.205
DS1	568	.324	.103	-1.130	.205
DS2	568	.273	.103	-1.105	.205
DS3	568	.266	.103	-.939	.205
DS4	568	.410	.103	-.963	.205
DS5	568	.421	.103	-.940	.205
DS6	568	.102	.103	-1.103	.205
DS7	568	.277	.103	-.945	.205
DS8	568	.309	.103	-1.043	.205
DS9	568	.682	.103	-.564	.205
DS10	568	.560	.103	-.562	.205
SS1	568	.688	.103	-.766	.205
SS2	568	.053	.103	-1.275	.205
SS3	568	.480	.103	-.826	.205
SS4	568	-.042	.103	-1.162	.205
SS5	568	.167	.103	-1.091	.205
SS6	568	.233	.103	-1.064	.205
SS7	568	.164	.103	-1.108	.205
SS8	568	.163	.103	-1.075	.205
SS9	568	-.071	.103	-1.018	.205
SS10	568	.176	.103	-.939	.205
SKP1	566	.872	.103	.208	.205
SKP2	566	.330	.103	-.704	.205
SKP3	566	.601	.103	-.175	.205
SKP4	566	-.586	.103	-.334	.205
PR	554	.017	.104	-.640	.207
SR	568	.532	.103	-.317	.205
CC	560	-.320	.103	-.537	.206
ID	558	.034	.103	-.014	.206
FR	567	.303	.103	-.824	.205
HPE	562	.882	.103	-.141	.206
REI	567	-.496	.103	-.143	.205
PERS	566	-.003	.103	-.863	.205
W	565	.037	.103	-.493	.205
ANG	562	1.042	.103	.550	.206
REIr	566	-.276	.103	.013	.205
TR	557	.095	.104	-.271	.207
DS	556	.127	.104	-.329	.207

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
SS	562	.226	.103	-.136	.206
OB	564	.037	.103	.087	.205
SKP	566	-.938	.103	2.404	.205
SEV	568	-.816	.103	.729	.205
SUS	568	.365	.103	-.670	.205
BI1	568	-.402	.103	-.865	.205
BI2	568	.755	.103	-.511	.205
BI3	568	.436	.103	-1.000	.205
BE1	568	-.072	.103	-1.186	.205
BE2	568	1.073	.103	.193	.205
BE3	568	.774	.103	-.589	.205
RE1	568	-.532	.103	-.771	.205
RE2	568	.527	.103	-.954	.205
RE3	568	.489	.103	-.966	.205
BI	568	.261	.103	-.704	.205
BE	568	.581	.103	-.438	.205
RE	568	.234	.103	-.745	.205
Valid N (listwise)	503				

Appendix B: Inter-Item Correlations

Pilot 1:Inter-Item Correlations for Susceptibility Scale

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1. LA_CC	1.00																															
2. LA_DRT	.343	1.00																														
3. LA_FLD	.162	.612	1.00																													
4. LA_GW	.782	.249	.116	1.00																												
5. LA_HW	.429	.518	.422	.392	1.00																											
6. LA_HPC	.247	.165	.207	.318	.354	1.00																										
7. LA_TOR	.160	.352	.470	.191	.451	.191	1.00																									
8. LA_WNV	.161	.525	.445	.157	.305	.187	.500	1.00																								
9. RA_CC	.788	.380	.191	.687	.471	.319	.193	.234	1.00																							
10. RA_DRT	.305	.657	.428	.256	.402	.125	.312	.321	.435	1.00																						
11. RA_FLD	.174	.440	.621	.150	.359	.206	.408	.339	.310	.651	1.00																					
12. RA_GW	.642	.286	.079	.746	.400	.271	.212	.218	.780	.334	.256	1.00																				
13. RA_HW	.383	.408	.341	.301	.599	.303	.314	.219	.493	.604	.597	.414	1.00																			
14. RA_HPC	.253	.227	.253	.328	.306	.814	.202	.195	.353	.276	.380	.320	.390	1.00																		
15. RA_TOR	.249	.305	.368	.248	.318	.266	.647	.305	.307	.450	.597	.241	.498	.386	1.00																	
16. RA_WNV	.167	.474	.369	.188	.266	.192	.408	.695	.233	.428	.403	.184	.265	.302	.513	1.00																
17. PA_CC	.684	.277	.106	.594	.405	.289	.142	.198	.815	.336	.244	.696	.450	.293	.190	.121	1.00															
18. PA_DRT	.314	.498	.326	.257	.301	.197	.280	.287	.447	.609	.437	.389	.393	.267	.331	.300	.591	1.00														
19. PA_FLD	.218	.352	.484	.209	.271	.162	.336	.135	.314	.463	.605	.290	.431	.329	.421	.203	.469	.764	1.00													
20. PA_GW	.611	.268	.145	.752	.375	.284	.170	.175	.697	.291	.240	.822	.332	.333	.205	.203	.764	.502	.415	1.00												
21. PA_HW	.421	.343	.319	.382	.564	.279	.316	.132	.550	.428	.430	.496	.696	.359	.360	.175	.660	.614	.672	.554	1.00											
22. PA_HPC	.302	.206	.220	.312	.265	.615	.130	.081	.408	.248	.305	.359	.372	.672	.242	.134	.517	.523	.576	.483	.628	1.00										
23. PA_TOR	.266	.227	.338	.221	.253	.224	.511	.176	.333	.336	.437	.266	.369	.315	.633	.299	.412	.628	.711	.355	.572	.525	1.00									
24. PA_WNV	.175	.338	.240	.138	.104	.098	.261	.544	.242	.317	.298	.244	.230	.240	.350	.609	.331	.538	.477	.277	.376	.395	.554	1.00								
25. EA_CC	.563	.402	.166	.467	.428	.200	.141	.368	.683	.399	.218	.537	.372	.224	.162	.268	.606	.330	.171	.453	.377	.247	.143	.276	1.00							
26. EA_DRT	.207	.630	.462	.145	.355	.216	.299	.424	.289	.615	.417	.193	.394	.287	.323	.476	.208	.478	.341	.157	.311	.238	.277	.356	.519	1.00						
27. EA_FLD	.142	.496	.590	.110	.348	.253	.378	.407	.196	.450	.540	.136	.328	.347	.380	.441	.113	.383	.435	.128	.253	.265	.344	.355	.328	.805	1.00					
28. EA_GW	.591	.336	.133	.702	.363	.283	.227	.298	.635	.284	.121	.693	.272	.286	.207	.247	.580	.331	.203	.636	.350	.272	.194	.242	.741	.398	.292	1.00				
29. EA_HW	.323	.454	.401	.309	.633	.297	.345	.388	.345	.403	.363	.302	.607	.327	.374	.424	.316	.313	.303	.285	.554	.269	.273	.233	.467	.623	.558	.383	1.00			

30. EA_HPC	.160	.206	.217	.211	.247	.710	.187	.232	.250	.181	.245	.187	.287	.759	.320	.331	.206	.210	.233	.172	.263	.584	.253	.237	.252	.392	.426	.268	.442	1.00			
31. EA_TOR	.165	.212	.369	.193	.232	.205	.618	.294	.200	.302	.364	.163	.299	.291	.632	.377	.151	.398	.404	.202	.331	.242	.600	.338	.060	.374	.514	.154	.417	.313	1.00	.	
32. EA_WNV	.037	.271	.295	.046	.119	.235	.365	.550	.090	.272	.301	.123	.193	.324	.370	.570	.117	.328	.264	.141	.176	.265	.327	.620	.184	.453	.563	.187	.319	.393	.572	1.00	
SD																																	

Pilot 1: Inter-Item Correlations for Severity Scale

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1. SEV-CC	1.00																							
2. SEV-DRT	.205	1.00																						
3. SEV-FLD	.123	.703	1.00																					
4. SEV-GW	.670	.195	.203	1.00																				
5. SEV-HW	.476	.497	.462	.433	1.00																			
6. SEV-HPC	.222	.192	.226	.202	.400	1.00																		
7. SEV-TOR	.030	.584	.666	.120	.407	.151	1.00																	
8. SEV-WNV	.052	.512	.524	.188	.464	.241	.603	1.00																
9. SNC-CC	.626	.025	-.003	.559	.269	.180	-.050	.047	1.00															
10. SNC-DRT	.277	.311	.321	.228	.368	.175	.278	.282	.543	1.00														
11. SNC-FLD	.136	.250	.400	.163	.302	.244	.325	.309	.418	.793	1.00													
12. SNC-GW	.348	.031	.043	.617	.146	.116	.055	.035	.640	.446	.446	1.00												
13. SNC-HW	.243	.208	.275	.298	.522	.281	.228	.347	.432	.690	.645	.514	1.00											
14. SNC-HPC	.160	.102	.089	.211	.289	.664	.153	.241	.273	.419	.421	.331	.557	1.00										
15. SNC-TOR	.030	.189	.320	.127	.143	.087	.510	.320	.241	.587	.686	.439	.492	.350	1.00									
16. SNC-WNV	.020	.263	.284	.127	.266	.180	.392	.637	.182	.398	.450	.221	.417	.371	.594	1.00								
17. EH-CC	.633	.028	-.037	.571	.252	.259	-.055	.032	.745	.312	.189	.490	.356	.327	.070	.047	1.00							
18. EH-DRT	.273	.440	.303	.289	.348	.224	.313	.315	.438	.694	.562	.367	.552	.428	.431	.259	.434	1.00						
19. EH-FLD	.300	.284	.448	.338	.402	.275	.310	.290	.402	.580	.602	.312	.503	.333	.456	.277	.379	.685	1.00					
20. EH-GW	.453	.051	.006	.724	.228	.205	-.029	.067	.588	.265	.253	.792	.395	.299	.194	.125	.665	.381	.390	1.00				
21. EH-HW	.348	.292	.220	.309	.519	.228	.165	.272	.350	.472	.475	.357	.693	.384	.274	.186	.454	.660	.546	.457	1.00			
22. EH-HPC	.223	.164	.134	.277	.329	.648	.065	.315	.295	.336	.335	.280	.466	.745	.192	.247	.442	.454	.383	.353	.507	1.00		
23. EH-TOR	.036	.320	.444	.148	.236	.148	.538	.343	.112	.450	.519	.226	.378	.200	.712	.379	.067	.516	.652	.188	.361	.231	1.00	
24. EH-WNV	.069	.270	.296	.190	.276	.156	.353	.651	.113	.291	.341	.119	.323	.251	.449	.791	.116	.335	.406	.179	.295	.310	.506	1.00
SD	25.88	26.78	26.25	24.00	23.95	26.10	27.79	29.62	28.47	23.80	23.40	25.26	25.82	27.79	23.48	26.90	28.43	23.33	21.58	25.22	25.13	26.26	22.67	24.55

Appendix C: Pilot 1 Factor Loadings

Scale	Risk	Factor 1 Loadings (Self/Human Dimension)	Factor 2 Loadings ('Other' /Non-human Dimension)	Factor Correlations	Kaiser Meyer Olkin (KMO) Measure of Sampling Adequacy	Bartlett's Test of Sphericity
Susceptibility scale (4 items): 1. It is likely that I will be affected by ___. 2. I am at risk for being affected by ___. 3. It is possible that I will be affected by ___. 4. The extent to which I will be affected by ___ is great.	T_SUS_FLD	**.934**	.127	-.487	.801	*p* <.001
	T_SUS_TOR	**.754**	.057			
	T_SUS_DRT	**.730**	-.137			
	T_SUS_WNV	**.655**	.038			
	T_SUS_HW	**.530**	**-.347**			
	T_SUS_HPC	**.385**	-.209			
	T_SUS_CC	-.006	**-.977**			
	T_SUS_GW	.010	**-.836**			
Severity scale (3 items): 1. I believe that ___ is severe. 2. I believe that ___ has serious negative consequences. 3. I believe that ___ is extremely harmful.	T_SEVrbd_TOR	**.911**	-.168	.381	.809	*p* <.001
	T_SEVrbd_FLD	**.832**	.128			
	T_SEVrbd_WNV	**.796**	-.113			
	T_SEVrbd_DRT	**.732**	.257			
	T_SEVrbd_HW	**.514**	**.505**			
	T_SEVrbd_CC	-.126	**.941**			
	T_SEVrbd_GW	-.032	**.864**			
	T_SEVrbd_HPC	.303	**.457**			

Pilot 1 - Factor analysis output for single item groups (factor loadings arranged by size)

Item (Variable name) [Variable abbreviation]	Risk	Factor 1 Loadings (People Dimension)	Factor 2 Loadings (Environment Dimension)	Factor Correlations	Kaiser MeyerOlkin (KMO) Measure of Sampling Adequacy	Bartlett's Test of Sphericity
I believe that ___ is severe.	SEV_TOR	**.836**	-.128	.328	.786	*p* <.001
	SEV_FLD	**.827**	-.012			
(Severity)	SEV_DRT	**.754**	.063			
	SEV_WNV	**.711**	-.011			
[SEV]	SEV_CC	-.156	**.931**			
	SEV_GW	.005	**.730**			
	SEV_HW	**.462**	**.476**			
	SEV_HPC	.216	.257			
I believe that ___ has serious negative consequences.	SNC_TOR	**.837**	-.089	.482	.791	*p* <.001
	SNC_FLD	**.778**	.137			
	SNC_WNV	**.697**	-.157			
(Serious negative consequences)	SNC_DRT	**.644**	.303			
	SNC_HW	**.618**	.262			
[SNC]	SNC_HPC	**.481**	.111			
	SNC_CC	-.046	**.910**			
	SNC_GW	.209	**.594**			
I believe that ___ is extremely harmful.	EH_TOR	**.899**	-.176	.418	.812	*p* <.001
	EH_FLD	**.702**	.239			
	EH_DRT	**.564**	**.379**			
(Extreme harm)	EH_WNV	**.552**	-.007			
	EH_CC	-.169	**.931**			
[EH]	EH_GW	.005	**.706**			
	EH_HW	.**374**	**.504**			
	EH_HPC	.227	**.462**			

Item (Variable name) [Variable abbreviation]	Risk	Factor 1 Loadings (People Dimension)	Factor 2 Loadings (Environment Dimension)	Factor Correlations	Kaiser MeyerOlkin (KMO) Measure of Sampling Adequacy	Bartlett's Test of Sphericity
The effects of ___ occur on a large scale. (Large scale) [LS]	LS_FLD	**.895**	-.138	.185	.771	*p* <.001
	LS_DRT	**.766**	.156			
	LS_TOR	**.754**	-.237			
	LS_HW	**.712**	.122			
	LS_WNV	**.489**	.015			
	LS_HPC	**.485**	.136			
	LS_GW	.065	**.812**			
	LS_CC	-.013	**.725**			
It is likely that I will be affected by ___. (Likelihood of being affected) [LA]	LA_FLD	**.788**	.101	-.384	.722	*p* <.001
	LA_DRT	**.713**	-.086			
	LA_WNV	**.674**	.055			
	LA_TOR	**.633**	.006			
	LA_HW	**.504**	**-.321**			
	LA_GW	-.089	**-.934**			
	LA_CC	-.019	**-.863**			
	LA_HPC	.195	-.273			
I am at risk for being affected by ___. (Risk of being affected) [RA]	RA_FLD	**.876**	.098	-.471	.797	*p* <.001
	RA_TOR	**.765**	.067			
	RA_DRT	**.688**	-.099			
	RA_HW	**.602**	-.229			
	RA_WV	**.576**	.056			
	RA_HPC	**.397**	-.180			
	RA_CC	.052	**-.903**			
	RA_GW	-.014	**-.847**			

Item (Variable name) [Variable abbreviation]	Risk	Factor 1 Loadings (People Dimension)	Factor 2 Loadings (Environment Dimension)	Factor Correlations	Kaiser MeyerOlkin (KMO) Measure of Sampling Adequacy	Bartlett's Test of Sphericity
It is possible that I will be affected by ___.	PA_FLD	**.886**	-.011	.602	.866	*p* <.001
	PA_TOR	**.878**	-.095			
Possibility of being affected	PA_DRT	**.711**	.181			
	PA_WNV	**.637**	-.048			
(PA)	PA_HPC	**.482**	.294			
	PA_HW	**.479**	**.419**			
	PA_CC	.010	**.921**			
	PA_GW	-.008	**.823**			
The extent to which I will be affected by ___ is great.	EA_TOR	**.848**	-.239	.313	.765	*p* <.001
	EA_WNV	**.830**	-.140			
	EA_FLD	**.807**	.150			
Extent to which affected	EA_DRT	**.625**	**.411**			
	EA_HPC	**.560**	.156			
(EA)	EA_HW	**.535**	**.416**			
	EA_CC	-.016	**.931**			
	EA_GW	-.009	**.871**			
I believe that the consequences of ___ are immediate.	CI_FLD	**.920**	-.128	.221	.767	*p* <.001
	CI_TOR	**.846**	-.170			
	CI_HW	**.742**	.138			
Consequences immediate	CI_WNV	**.676**	-.045			
	CI_DRT	**.605**	.209			
(CI)	CI_HPC	**.494**	.073			
	CI_GW	-.071	**.967**			
	CI_CC	.084	**.724**			

Item (Variable name) [Variable abbreviation]	Risk	Factor 1 Loadings (People Dimension)	Factor 2 Loadings (Environment Dimension)	Factor Correlations	Kaiser MeyerOlkin (KMO) Measure of Sampling Adequacy	Bartlett's Test of Sphericity
There are steps that I should personally take to combat the effects of ___.	PS_TOR	**.901**	-.173	.291	.814	*p* <.001
	PS_FLD	**.899**	-.088			
Personal steps	PS_HW	**.752**	.092			
	PS_HPC	**.725**	-.071			
(PS)	PS_DRT	**.690**	.256			
	PS_WNV	**.473**	.177			
	PS_CC	.084	**.837**			
	PS_GW	-.050	**.814**			
___ exists in a very abstract way in my mind.	AB_FLD	**.896**	-.036	.537	.838	*p* <.001
	AB_DRT	**.873**	-.051			
	AB_TOR	**.823**	-.059			
Abstractness	AB_HW	**.751**	.107			
	AB_WNV	**.720**	.021			
(AB)	AB_HPC	**.672**	.085			
	AB_GW	-.077	**.993**			
	AB_CC	.144	**.717**			
___ primarily affects people in other countries.	POC_FLD	.824	N/A	N/A	.881	*p* <.001
	POC_HPC	.791	N/A			
	POC_CC	.790	N/A			
People in other countries	POC_GW	.778	N/A			
	POC_HW	.765	N/A			
(POC)	POC_TOR	.734	N/A			
	POC_DRT	.694	N/A			
	POC_WNV	.516	N/A			

Item (Variable name) [Variable abbreviation]	Risk	Factor 1 Loadings (People Dimension)	Factor 2 Loadings (Environment Dimension)	Factor Correlations	Kaiser MeyerOlkin (KMO) Measure of Sampling Adequacy	Bartlett's Test of Sphericity
___ affects the natural environment more than it affects people. Environment more than people (EMP)	EMP_FLD	**.763**	-.152	-.540	.872	*p* <.001
	EMP_TOR	**.756**	-.069			
	EMP_WNV	**.731**	.173			
	EMP_HW	**.699**	-.234			
	EMP_HPC	**.662**	.001			
	EMP_DRT	**.635**	**-.319**			
	EMP_CC	-.004	**-.962**			
	EMP_GW	.114	**-.775**			
I consider ___ to be personally relevant. Personal relevance (PR)	PR_FLD	**.836**	-.026	.590	.833	*p* <.001
	PR_DRT	**.806**	.081			
	PR_TOR	**.805**	-.038			
	PR_WNV	**.709**	-.037			
	PR_HW	**.679**	.179			
	PR_HPC	**.560**	-.020			
	PR_CC	-.008	**.972**			
	PR_GW	.026	**.801**			
I think that humans can work together to prevent ___. Work Together (WT)	WT_HW	**.912**	-.048	.374	.841	*p* <.001
	WT_HPC	**.869**	-.034			
	WT_TOR	**.861**	-.131			
	WT_FLD	**.812**	.021			
	WT_DRT	**.647**	.141			
	WT_WNV	**.341**	.218			
	WT_CC	.051	**.917**			
	WT_GW	-.035	**.672**			

Note: Data for 'extent affected' (EA) was obtained through principal component analysis. When principal axis factoring was tried (as in the other analyses), attempts were made to extract two factors but in one of the iterations, the communality of one of the items exceeded 1 and the extraction was terminated.

Appendix D: Measures

Individual Information Processing Style

0 - 100 point scale (0= definitely not true of myself; 100 = definitely true of myself) based on Pacini & Epstein (1999).

Modified Rational Experiential Inventory (REIm, Norris & Epstein, 2011)

1. R I enjoy problems that require hard thinking.
2. R- I am not very good in solving problems that require careful logical analysis.
3. R I enjoy intellectual challenges.
4. R I prefer complex to simple problems.
5. R- I don't like to have to do a lot of thinking.
6. R- Reasoning things out carefully is not one of my strong points.
7. R- I am not a very analytical thinker.
8. R- I try to avoid situations that require thinking in depth about something.
9. R I am much better at figuring things out logically than most people.
10. R I have a logical mind.
11. R Using logic usually works well for me in figuring out problems in my life.
12. R- Knowing the answer without understanding the reasoning behind it is good enough for me.
13. E I enjoy reading things that evoke visual images.
14. E I enjoy imagining things.
15. E I can clearly picture or remember some sculpture or natural object (not alive) that

I think is very beautiful.

16. E I identify strongly with demographics in movies or books I read.

17. E I tend to describe things by using images or metaphors, or creative comparisons.

18. E Art is really important to me.

19. E Sometimes I like to just sit back and watch things happen.

20. E I have favorite poems and paintings that mean a lot to me.

21. E When I travel or drive anywhere, I always watch the landscape and scenery.

22. E- I almost never think in visual images.

23. E- My emotions don't make much difference in my life.

24. E- Emotions don't really mean much: they come and go.

25. E When I have a strong emotional experience, the effect stays with me for a long time.

26. E When I'm sad, it's often a very strong feeling.

27. E Things that make me feel emotional don't seem to affect other people as much.

28. E Everyday experiences often evoke strong feelings in me.

29. E I'd rather be upset sometimes and happy sometimes, than always feel calm.

30. E- I don't react emotionally to scary movies or books as much as most people do.

31. E My anger is often very intense.

32. E- When I'm happy, the feeling is usually more like contentment than like exhilaration or excitement.

33. E I like to rely on my intuitive impressions.

34. E I often go by my instincts when deciding on a course of action.

35. E- I don't think it is a good idea to rely on ones intuition for important decisions.

36. E- I trust my initial feelings about people.

37. E- I tend to use my heart as a guide for my actions.

38. E I enjoy learning by doing something, instead of figuring it out first.

39. E I can often tell how people feel without them having to say anything.

40. E- I generally don't depend on my feelings to help me make decisions.

41. E For me, descriptions of actual people's experiences are more convincing than discussions about ''facts.''

42. E- I'm not a very spontaneous person.

Transportation

0 - 100 point scale (0 = completely disagree; 100 = completely agree) based on Green and Brock (2000). This study will use a version of the scale adapted by Dal Cin, Zanna, and Fong (2004). The items are as follows:

1. I can easily envision the events in the story.

2. I find I can easily lose myself in the story.

3. I find it difficult to tune out activity around me.

4. I can easily envision myself in the events described in a story.

5. I get mentally involved in the story.

6. I can easily put stories out of my mind after I've finished reading them.

7. I sometimes feel as if I am part of the story.

8. I am often impatient to find out how the story ends.

9. I find that I can easily take the perspective of the demographic(s) in the story.

10. I am often emotionally affected by what I've read.

11. I have vivid images of the demographics.

12. I find myself thinking of other ways the story could have ended.

13. My mind often wanders.

14. I find myself feeling what the demographics may feel.

15. I find that events in the story are relevant to my everyday life.

16. I often find that reading stories has an impact on the way I see things.

17. I easily identify with demographics in the story.

18. I have vivid images of the events in the story.

Self Referencing

0 - 100 point scale (0 = strongly agree; 100 = strongly disagree) reverse-coded, using a scale designed by Burnkrant and Unnava (1989). The blank spaces will be replaced by the relevant risk. The items for this scale are as follows:

1. This message seemed to be written with me in mind.
2. This message seemed to relate to me personally.
3. This message made me think of my personal experiences with _____.
4. I thought about my own _____ when I was reading this message.

Identification

0 – 100 point scale (0 = not at all; 100 = very much) based on Cohen (2001) and Sestir and Green (2010). The wording of the scale was adapted for this study for example "viewing program X" in the original scale was replaced by "reading the story."

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

Personal Relevance

0 – 100 point bipolar scale adapted from Zaiwkowsky (1994) personal involvement inventory.

An adaptation of Zaichowsky instructions follows: "Place a mark at the point in the scale that best represents how these adjectives describe _____." The items with asterisks(*) will be reversely coded.

1. Important ____ ____ ____ ____ ____ ____ Unimportant*

2. Of no concern to me ____ ____ ____ ____ ____ ____ Of concern to me
3. Irrelevant ____ ____ ____ ____ ____ ____ Relevant
4. Means a lot to me ____ ____ ____ ____ ____ ____ Means nothing to me*
5. Trivial ____ ____ ____ ____ ____ ____ Fundamental
6. Matters to me ____ ____ ____ ____ ____ ____ Doesn't matter*
7. Uninterested ____ ____ ____ ____ ____ ____ Interested
8. Significant ____ ____ ____ ____ ____ ____ Insignificant*

Susceptibility

Taken from the Risk Behavior Diagnostic Scale (RBD; Witte, McKeon, Cameron, & Berkowitz, 1995), and one additional item added by the researcher. Scale of 0 to 100 where 0 = strongly disagree, and 100 = strongly agree.

RBD Items:

(1) it is likely that I will be affected by ___

(2) I am at risk for being affected by ___

(3) It is possible that I will be affected by___

Additional item: (4) The extent to which I will be affected by ___ is great

Severity

Taken from the Risk Behavior Diagnostic Scale (RBD; Witte, McKeon, Cameron, & Berkowitz, 1995), and one additional item added by the researcher. Scale of 0 to 100 where 0 = strongly disagree, and 100 = strongly agree.

RBD Items:

(1) I believe that ___ is severe

(2) I believe that ___ has serious negative consequences

(3) I believe that ___is extremely harmful

Additional item: (4) The effects of ___ occur on a large scale

Persuasiveness

Taken from a scale developed by Turner (n.d.). Scale of 0 to 100 where 0 = strongly disagree, and 100 = strongly agree

1. The news story I read was compelling.
2. The news story I read was persuasive.
3. The news story I read was convincing.
4. The news story I read was swaying.

Behavioral Intention

0 - 100 point scale (0 = completely disagree; 100 = completely agree)

1. Behavior #1. Don't drink tap water during a drought
2. Behavior #2. Stay hydrated at all times
3. Behavior #3. Use boiled water when preparing food
4. Behavior #4. Increase water conservation
5. Behavior #5. Seek more information about drought within 1 week
6. Behavior #5. Seek more information about drought when I have time

Behavioral Expectation (Idea for including this variable taken from Warshaw & Davis, 1985).

0 - 100 point scale (0 = completely disagree; 100 = completely agree)

1. Behavior #1. Don't drink tap water during a drought
2. Behavior #2. Stay hydrated at all times
3. Behavior #3. Use boiled water when preparing food
4. Behavior #4. Increase water conservation
5. Behavior #5. Seek more information about drought within 1 week
6. Behavior #5. Seek more information about drought when I have time

Demographic Similarity

0 - 100 point scale (0 = completely disagree; 100 = completely agree)

1. The social class of the characters in this story is very similar to mine. ____
2. The status of the characters in this story is very different from mine. ____
3. The economic situation of the characters in this story is very different from mine. ____
4. The background of the characters in this story is very similar to mine. ____
5. The status of the characters in this story is very much like mine. ____
6. The characters are from a social class very different from mine. ____
7. The characters are from an economic situation very much like mine. ____
8. The background of the characters in this story is very different from mine. ____
9. The characters in this story and I come from a very similar geographic region. ____
10. The characters in this story and I have a lot in common. ____

Scene Similarity

0 - 100 point scale (0 = completely disagree; 100 = completely agree)

1. The characters in this story live in a place very similar to where I currently live. ____
2. The characters in this story work in a place very different from where I attend college. ____
3. The characters in this story are from a community very similar to mine. ____
4. The college in this story is very different from mine. ____
5. The characters in this story live in a place very different from where I currently live. ____ The characters in this story work in a place very similar to where I attend college. ____
6. The characters in this story are from a community very different from mine. ____
7. The college in this story is very similar to mine. ____
8. I can identify with the work/school environment portrayed in this story. ____
9. I can identify with the residential community of the characters in this story. ____

Appendix E: Study Questionnaires

Pilot 1 questionnaire

(1) I believe that *(name of risk below)* is severe.

[Please write a number between 0 and 100 next to **EACH** risk, where 0 = strongly disagree, and 100 = strongly agree indicating the extent to which you agree with the above statement.]

Climate change	_____	Heat wave	_____
Drought	_____	High pollen count	_____
Flood	_____	Tornado	_____
Global warming	_____	West Nile Virus	_____

(2) I believe that *(name of risk below)* has serious negative consequences.

[Please write a number between 0 and 100 next to **EACH** risk, where 0 = strongly disagree, and 100 = strongly agree indicating the extent to which you agree with the above statement.]

Climate change	_____	Heat wave	_____
Drought	_____	High pollen count	_____
Flood	_____	Tornado	_____
Global warming	_____	West Nile Virus	_____

(3) I believe that *(name of risk below)* is extremely harmful.

[Please write a number between 0 and 100 next to **EACH** risk, where 0 = strongly disagree, and 100 = strongly agree indicating the extent to which you agree with the above statement.]

Climate change	_____	Heat wave	_____
Drought	_____	High pollen count	_____
Flood	_____	Tornado	_____
Global warming	_____	West Nile Virus	_____

(4) The effects of *(name of risk below)* occur on a large-scale.

[Please write a number between 0 and 100 next to **EACH** risk, where 0 = strongly disagree, and 100 = strongly agree indicating the extent to which you agree with the above stateme

Climate change	_____	Heat wave	_____
Drought	_____	High pollen count	_____
Flood	_____	Tornado	_____
Global warming	_____	West Nile Virus	_____

(5) It is likely that I will be affected by *(name of risk below*).

[Please write a number between 0 and 100 next to **EACH** risk, where 0 = strongly disagree, and 100 = strongly agree indicating the extent to which you agree with the above statement.]

Climate change	_____	Heat wave	_____
Drought	_____	High pollen count	_____
Flood	_____	Tornado	_____
Global warming	_____	West Nile Virus	_____

(6) I am at risk for being affected by *(name of risk below*).

[Please write a number between 0 and 100 next to **EACH** risk, where 0 = strongly disagree, and 100 = strongly agree indicating the extent to which you agree with the above statement.]

Climate change	_____	Heat wave	_____
Drought	_____	High pollen count	_____
Flood	_____	Tornado	_____
Global warming	_____	West Nile Virus	_____

(7) It is possible that I will be affected by *(name of risk below*).

[Please write a number between 0 and 100 next to **EACH** risk, where 0 = strongly disagree, and 100 = strongly agree indicating the extent to which you agree with the above statement.]

Climate change	_____	Heat wave	_____
Drought	_____	High pollen count	_____
Flood	_____	Tornado	_____
Global warming	_____	West Nile Virus	_____

(8) The extent to which I will be affected by *(name of risk below*) is great?

[Please write a number between 0 and 100 next to **EACH** risk, where 0 = strongly disagree, and 100 = strongly agree indicating the extent to which you agree with the above statement.]

Climate change	_____	Heat wave	_____
Drought	_____	High pollen count	_____
Flood	_____	Tornado	_____
Global warming	_____	West Nile Virus	_____

(9) I believe that the consequences of *(name of risk below*) are immediate.

[Please write a number between 0 and 100 next to **EACH** risk, where 0 = strongly disagree, and 100 = strongly agree indicating the extent to which you agree with the above statement.]

Climate change	_____	Heat wave	_____
Drought	_____	High pollen count	_____
Flood	_____	Tornado	_____
Global warming	_____	West Nile Virus	_____

(10) There are steps that I should personally take to combat the effects of *(name of risk below*).

[Please write a number between 0 and 100 next to **EACH** risk, where 0 = strongly disagree, and 100 = strongly agree indicating the extent to which you agree with the above statement.]

Climate change	_____	Heat wave	_____
Drought	_____	High pollen count	_____
Flood	_____	Tornado	_____
Global warming	_____	West Nile Virus	_____

(11) *(Name of risk below*) exists in a very abstract way in my mind.

[Please write a number between 0 and 100 next to **EACH** risk, where 0 = strongly disagree, and 100 = strongly agree indicating the extent to which you agree with the above statement.]

Climate change	_____	Heat wave	_____
Drought	_____	High pollen count	_____
Flood	_____	Tornado	_____
Global warming	_____	West Nile Virus	_____

(12) *(Name of risk below)* primarily affects people in other countries.

[Please write a number between 0 and 100 next to **EACH** risk, where 0 = strongly disagree, and 100 = strongly agree indicating the extent to which you agree with the above statement.]

Climate change	_____	Heat wave	_____
Drought	_____	High pollen count	_____
Flood	_____	Tornado	_____
Global warming	_____	West Nile Virus	_____

(13) *(Name of risk below)* affects the natural environment more than it affects people.

[Please write a number between 0 and 100 next to **EACH** risk, where 0 = strongly disagree, and 100 = strongly agree indicating the extent to which you agree with the above statement.]

Climate change	_____	Heat wave	_____
Drought	_____	High pollen count	_____
Flood	_____	Tornado	_____
Global warming	_____	West Nile Virus	_____

(14) I consider *(name of risk below)* to be personally relevant.

[Please write a number between 0 and 100 next to **EACH** risk, where 0 = strongly disagree, and 100 = strongly agree indicating the extent to which you agree with the above statement.]

Climate change	_____	Heat wave	_____
Drought	_____	High pollen count	_____
Flood	_____	Tornado	_____
Global warming	_____	West Nile Virus	_____

(15) I think that humans can work together to prevent (*name of risk below*).

[Please write a number between 0 and 100 next to **EACH** risk, where 0 = strongly disagree, and 100 = strongly agree indicating the extent to which you agree with the above statement.]

Climate change	_____	Heat wave	_____
Drought	_____	High pollen count	_____
Flood	_____	Tornado	_____
Global warming	_____	West Nile Virus	_____

16. Which of the following events have you personally experienced? (Multiple answers okay).

Climate change	_____	Heat wave	_____
Drought	_____	High pollen count	_____
Flood	_____	Tornado	_____
Global warming	_____	West Nile Virus	_____

<u>Tell us a little about yourself</u>

(a) How old are you?

18 – 21 years_____ 22 – 25_____ 26 - 29_____ 30 or over_____

(b) What is your major?

_____

(c) Year in school?

Freshman_____ Sophomore_____ Junior_____ Senior_____
Other_____

(d) Gender? Male_____ Female_____ I prefer not to answer_____

(e) With which political philosophy do you most identify?

Democratic_____ Republican_____ Other (specify)_____

(f) Which state (or country) do you consider home?_____

(g) Which type of place attachment is stronger for you in terms of the Maryland/Virginia/DC area?

Goal/functional attachment_____ Emotional/symbolic attachment_____

Pilot 2 Questionnaire

Before you begin to answer the survey questions, please indicate your story numberStory #1___

a) Story #2___
b) Story #3___
c) Story #4___
d) Story #5___
e) Story #6___
f) Story #7___
g) Story #8__

Part 1

Instructions:

Please think about the story you just read and indicate the extent of your agreement or disagreement with **EACH** of the following statements by writing a number between 0 and 100 next to **EACH** question, where 0 = Strongly disagree, **AND** 100 = Strongly agree.

1. This story seemed to be written with me in mind. _____
2. This story seemed to relate to me personally. _____
3. This story made me think of my personal experiences with West Nile Virus/drought. _____
4. I thought about my own risk of being affected by West Nile Virus/drought when I was reading this story. _____

Part 2

Instructions:

Please think about the story you just read, **especially the characters involved**, and indicate the extent of your agreement or disagreement with **EACH** of the following statements by writing a number between 0 and 100 next to **EACH** question, where 0 = Strongly disagree, **AND** 100 = Strongly agree.

Write a # between 0 & 100 to indicate your level of agreement with the following question:

The status of the characters in this story is very much like mine.

11. The social class of the characters in this story is very similar to mine. ____
12. The status of the characters in this story is very different from mine. ____
13. The economic situation of the characters in this story is very different from mine. ____
14. The background of the characters in this story is very similar to mine. ____
15. The status of the characters in this story is very much like mine. ____
16. The characters are from a social class very different from mine. ____
17. The characters are from an economic situation very much like mine. ____
18. The background of the characters in this story is very different from mine. ____
19. The characters in this story and I come from a very similar geographic region. ____
20. The characters in this story and I have a lot in common. ____

Part 3

Instructions:

Please think about the story you just read, **especially the placed described**, and indicate the extent of your agreement or disagreement with **EACH** of the following statements by writing a number between 0 and 100 next to **EACH** question, where 0 = Strongly disagree, **AND** 100 = Strongly agree.

Write a # between 0 & 100 to indicate your level of agreement with the following question:

The status of the characters in this story is very much like mine.

1. The characters in this story live in a place very similar to where I currently live. ____

2. The characters in this story work in a place very different from where I attend college. ____
3. The characters in this story are from a community very similar to mine. ____
4. The college in this story is very different from mine. ____
5. The characters in this story live in a place very different from where I currently live. ____
6. The characters in this story work in a place very similar to where I attend college. ____
7. The characters in this story are from a community very different from mine. ____
8. The college in this story is very similar to mine. ____
9. I can identify with the work/school environment portrayed in this story. ____
10. I can identify with the residential community of the characters in this story. ____

Part 4

Instructions:

Please think about the story you just read, **especially the characters involved**, and indicate the extent of your agreement or disagreement with **EACH** of the following statements by writing a number between 0 and 100 next to **EACH** question, where 0 = Strongly disagree, **AND** 100 = Strongly agree.

1. The news story I read was compelling. ____
2. The news story I read was persuasive. ____
3. The news story I read was convincing. ____
4. The news story I read was swaying. ____

Part 5

Instructions:

Think about the **emotions** you felt when you read this story and indicate the extent to which the story made you feel different emotions by writing a number between 0 to 100 in the space next to **EACH** question, where 0 = None of the emotion, **AND** 100 = The maximum amount of the emotion you could possibly feel.

1. Please indicate the extent to which the story made you feel fear. ____
2. Please indicate the extent to which the story made you feel frustration. ____
3. Please indicate the extent to which the story made you feel sadness. ____
4. Please indicate the extent to which the story made you feel worry. ____
5. Please indicate the extent to which the story made you feel hope. ____
6. Please indicate the extent to which the story made you feel happiness. ____

Part 6

Instructions:

Think about **how this story applies to you personally** and indicate the extent of this connection by writing a number between 0 to 100 in the space next to **EACH** question. The meaning of 0 and 100 is different for each question so please pay attention to EACH meaning as given at the end of each question.

1. Please indicate the level of importance this story has to you. ____
2. Please indicate the level of concern this story has to you. ____
3. Please indicate the level of relevance this story has to you. ____
4. Please indicate the level of meaning this story has to you. ____
5. Please indicate the level of triviality or fundamentality this story has to you. ____
6. Please indicate the level of how much this story matters to you. ____
7. Please indicate your level of interest in this story. ____
8. Please indicate the level of significance this story has to you. ____

Part 7

Instructions:

Please think about the story you just read and indicate the extent of your agreement or disagreement with **EACH** of the following statements by writing a number between 0 and 100 next to **EACH** question, where 0 = Strongly disagree, **AND** 100 = Strongly agree.

1. I was able to easily envision the events in this story._____

2. I was able to easily lose myself in this story._____
3. I find it difficult to tune out activity around me._____
4. I was able to easily envision myself in the events described in this story. _____
5. I have vivid images of the scenes in the story._____
6. I was mentally involved in this story._____
7. I can easily put stories out of my mind after reading them. _____
8. I sometimes felt as though I was part of this story._____
9. I was impatient to find out how this story ended._____
10. I was able to easily take the perspective of the characters in this story._____
11. I am often emotionally affected by what I've read. _____
12. I have vivid images of the characters in this story._____
13. I found myself thinking of other ways this story could have ended._____
14. My mind often wanders._____
15. I found myself feeling what the characters in this story may have felt._____
16. The events in this story are relevant to my everyday life._____
17. I often find that reading stories has an impact on the way I see things._____
18. I easily identify with characters in this story._____
19. I have vivid images of the events in this story._____

Part 8

Instructions:

Please think about the story you just read and the characters involved, and indicate the extent of your agreement or disagreement with **EACH** of the following statements by writing a number between 0 and 100 next to **EACH** question, where 0 = Strongly disagree, **AND** 100 = Strongly agree.

1. While reading this story, I felt as if I was part of what was taking place. ____
2. While reading the story, I forgot myself and was fully absorbed. ____
3. I was able to understand the events in this story in a manner similar to that in which the characters understood them. ____
4. I think I have a good understanding of the characters in this story. ____

5. I tend to understand the reasons why the characters in this story did what they did. ____
6. While reading this story I could feel the emotions the characters portrayed. ____
7. While reading this story, I felt I could really get inside the characters' heads. ____
8. At key moments in this story, I felt I knew exactly what the characters were going through. ____
9. While reading the story, I wanted the characters to succeed in achieving their goals. ____
10. When characters succeed I felt joy, but when they failed I was sad. ____

Part 9

Instructions:

We'd like to know a little bit about you. The information provided is completely anonymous and will be combined with information from all other participants in this study to provide a general description of study participants as a whole.

1. How old are you?
2. 18 – 21 years____
3. 22 – 25_____
4. 26 - 29_____
5. 30 or over_____

2. What is your major?

_____

3. Year in school? Freshman_____
   a) Sophomore_____
   b) Junior_____
   c) Senior____
   d) Other (specify)_____
4. GenderMale_____
   a) Female_____
   b) Gender neutral____

c) Transgender___

d) I prefer not to answer_____

5. With which ethnic group do you identify?

a) Asian/Pacific Islander____

b) Black/African-American____

c) Hispanic/Latino____

d) White/Caucasian____

e) Native American Indian____

f) Other (specify)_____

g) I prefer not to answer____

6. With which political philosophy do you **most** identify?

a) Democratic_____

b) Republican_____

c) Other (specify)_____

d) I prefer not to answer_____

7. Which state (or country) do you consider home?_____

8. Do you have a full or part-time job besides being a student? Yes_____ No_____

9. How do you pay for your personal healthcare needs? I am covered under my parents' health insurance plan ___

a) I have my own health insurance___

b) I have Medicaid___

c) I have no health insurance___

d) Other (please specify) _____

e) I prefer not to answer _____

10. Which type of place attachment is **stronger** for you in terms of the Maryland/Virginia/DC area?

a) Goal/functional attachment_____

b) Emotional/symbolic attachment_____

11. Please give an estimate of your personal annual income_____

12. Please give an estimate of the total annual income of your parents_____

13. In which social class do you consider yourself?

a) Lower lower class___
b) Upper lower class___
c) Working class___
d) Middle class___
e) Upper middle class___
f) Lower upper class___
g) Upper upper class____

13. What are you views on climate change?

a) Definitely happening___
b) It's a hoax___
c) Not sure___

FINAL PART

Before we told you what this study was all about, did you honestly:

(1) Think this as a real news story? Yes____ No____ Not sure ____

(2) Figure out the real purpose of the study? Yes____ No____ Not sure____

Main Study Questionnaire

Treatment

(Participants randomly assigned to read one of the stories found in Appendix G).

Before you begin to answer the survey questions, please indicate your story number.

a) Story #1___
b) Story #2___
c) Story #3___
d) Story #4___
e) Story #5___
f) Story #6___
g) Story #7___
h) Story #8___

Part A

Instructions:

In this story you read about a RISK, either WEST NILE VIRUS or DROUGHT. Please indicate the extent to which you agree with **EACH** the following statements about the RISK IN THE STORY YOU JUST READ by writing a number between 0 to 100 in the space next to **EACH** question. In this section 0 = Strongly disagree, **AND** 100 = Strongly agree.

(1) I believe that the risk described in this story is severe. ___
(2) I believe that the risk described in this story has serious negative consequences. ___
(3) I believe that the risk described in this story is extremely harmful. ____
(4) The effects of the risk described in this story occur on a large-scale. ____
(5) It is likely that I will be affected by the risk described in this story. ____
(6) I am at risk for being affected by the risk described in this story. ____
(7) It is possible that I will be affected by the risk described in this story. ____
(8) The extent to which I will be affected by risk described in this story is great? ____

Part B

Think about **how this story applies to you personally** and indicate the extent of this connection by writing a number between 0 to 100 in the space next to **EACH** question. The meaning of 0 and 100 is **different for each question** so please pay attention to their meanings given at the end of each question.

1. Please indicate the level of importance this story has to you. ____
2. Please indicate the level of concern this story has to you. ____
3. Please indicate the level of relevance this story has to you. ____
4. Please indicate the level of meaning this story has to you. ____
5. Please indicate the level of triviality or fundamentality this story has to you. ____
6. Please indicate the level of how much this story matters to you. ____
7. Please indicate your level of interest in this story. ____
8. Please indicate the level of significance this story has to you. ____

Part C

Instructions:

i. Please indicate the extent to which you **INTEND** to carry out the following behaviors, by writing a number between 0 to 100 in the space next to **EACH** behavior, where 0 = No intention at all, **AND** 100 = Every intention.

7. Behavior #1. Don't drink tap water during a drought
8. Behavior #2. Stay hydrated at all times
9. Behavior #3. Use boiled water when preparing food
10. Behavior #4. Increase water conservation
11. Behavior #5. Seek more information about drought within 1 week
12. Behavior #5. Seek more information about drought when I have time

ii. Please indicate the extent to which you **EXPECT** to **ACTUALLY** carry out the following behaviors, by writing a number between 0 to 100 in the space next to **EACH** behavior, where 0 = No expectation at all, **AND** 100 = Every expectation.

1. Behavior #1. Don't drink tap water during a drought
2. Behavior #2. Stay hydrated at all times
3. Behavior #3. Use boiled water when preparing food
4. Behavior #4. Increase water conservation
5. Behavior #5. Seek more information about drought within 1 week
6. Behavior #5. Seek more information about drought when I have time

iii. Please indicate the extent to which you **HAVE THE CAPABILITY** of carrying out the following behaviors, by writing a number between 0 to 100 in the space next to **EACH** behavior, where 0 = No capability at all, **AND** 100 = Every capability.

1. Behavior #1. Don't drink tap water during a drought
2. Behavior #2. Stay hydrated at all times
3. Behavior #3. Use boiled water when preparing food
4. Behavior #4. Increase water conservation
5. Behavior #5. Seek more information about drought within 1 week
6. Behavior #5. Seek more information about drought when I have time

iv. Please indicate the extent to which the following behaviors **WILL ACTUALLY REDUCE THE RISK** you read about in the story, by writing a number between 0 to 100 in the space next to **EACH** behavior, where 0 = Will not reduce the risk at all, **AND** 100 = Will eliminate the risk.

1. Behavior #1. Don't drink tap water during a drought
2. Behavior #2. Stay hydrated at all times
3. Behavior #3. Use boiled water when preparing food
4. Behavior #4. Increase water conservation

5. Behavior #5. Seek more information about drought within 1 week
6. Behavior #5. Seek more information about drought when I have time

Part D

Instructions:

People process information in different ways. There is no right or wrong way. We'd like to know a little of how you generally process information. Please indicate the extent to which you agree with the following statements by writing a number between 0 to 100 in the space next to **EACH** question, where 0 = Strongly disagree **AND** 100 = Strongly agree.

1. I don't like to have to do a lot of thinking. _____
2. I try to avoid situations that require thinking in depth about something. _____
3. I prefer to do something that challenges my thinking abilities rather than something that requires little thought. _____
4. I prefer complex to simple problems. _____
5. Thinking hard and for a long time about something gives me little satisfaction. _____
6. I trust my initial feelings about people. _____
7. I believe in trusting my hunches. _____
8. My initial impressions of people are almost always right. _____
9. When it comes to trusting people, I can usually rely on my "gut feelings." _____
10. I can usually feel when a person is right or wrong even if I can't explain how I know. _____

Part E

Instructions:

In this story you read about a RISK, either WEST NILE VIRUS or DROUGHT. Please answer the following questions by writing a number between 0 to 100 in the space next to **EACH** question. Except for #6, the questions refer to the RISK IN THE STORY YOU

JUST READ. The meaning of 0 and 100 is different for each question so please pay attention to EACH meaning as given at the end of each question.

1. To what extent have **YOU** been personally affected by the risk described in the story? _____

2. Think of **SOMEONE YOU PERSONALLY KNOW** who has experienced the risk described in the story? To what extent has that person been **affected by this risk**? _____

3. To what extent are YOU **likely to be affected** by the risk described in the story? _____

4. To what extent is someone very similar to you **likely to be affected by the risk** described in the story? _____

5. To what extent is someone very different from you **likely to be affected by the risk** described in the story? _____

6. In what general health condition do you consider yourself? _____

7. The risk I read about is more of a threat to the environment than to people. _____

Part F

Instructions:

Please indicate the extent of your agreement or disagreement with **EACH** of the following statements by writing a number between 0 and 100 next to **EACH** question, where 0 = Strongly disagree, and 100 = Strongly agree].

1. The balance of nature is very delicate and easily upset. _____
2. Modifying the environment for human use seldom causes serious problems._____
3. Plants and animals exist primarily to be used by humans. _____
4. The earth is like a spaceship with only limited room and resources. _____
5. There are limits to economic growth even for developed countries like ours. _____
6. Humans were meant to rule over the rest of nature. _____
7. Climate change is definitely happening. _____

Part G

Instructions:

i. Please think about the story you just read and indicate the extent of your agreement or disagreement with **EACH** of the following statements by writing a number between 0 and 100 next to **EACH** question, where 0 = Strongly disagree, **AND** 100 = Strongly agree.

1. I was able to easily envision the events in this story._____
2. I was able to easily lose myself in this story._____ I find it difficult to tune out activity around me._____
3. I was able to easily envision myself in the events described in this story. _____
4. I have vivid images of the scenes in the story._____
5. I was mentally involved in this story._____
6. I can easily put stories out of my mind after reading them. _____
7. I sometimes felt as though I was part of this story._____
8. I was impatient to find out how this story ended._____
9. I was able to easily take the perspective of the characters in this story._____
10. I am often emotionally affected by what I've read. _____
11. I have vivid images of the characters in this story._____
12. I found myself thinking of other ways this story could have ended._____
13. My mind often wanders._____
14. I found myself feeling what the characters in this story may have felt._____
15. The events in this story are relevant to my everyday life._____
16. I often find that reading stories has an impact on the way I see things._____
17. I easily identify with characters in this story._____
18. I have vivid images of the events in this story.

Part H

Instructions:

ii. Please think about the story you just read and indicate the extent of your agreement or disagreement with **EACH** of the following statements by writing a number between 0 and 100 next to **EACH** question, where 0 = Strongly disagree, **AND** 100 = Strongly agree.

1. This story seemed to be written with me in mind. _____
2. This story seemed to relate to me personally. _____
3. This story made me think of my personal experiences with West Nile Virus/drought. _____
4. I thought about my own risk of being affected by West Nile Virus/drought when I was reading this story. _____

Part I

Instructions:

Please think about the story you just read and the characters involved, and indicate the extent of your agreement or disagreement with **EACH** of the following statements by writing a number between 0 and 100 next to **EACH** question, where 0 = Strongly disagree, **AND** 100 = Strongly agree.

1. While reading this story, I felt as if I was part of what was taking place. ____
2. While reading the story, I forgot myself and was fully absorbed. ____
3. I was able to understand the events in this story in a manner similar to that in which the characters understood them. ____
4. I think I have a good understanding of the characters in this story. ____
5. I tend to understand the reasons why the characters in this story did what they did. ____
6. While reading this story I could feel the emotions the characters portrayed. ____
7. While reading this story, I felt I could really get inside the characters' heads. ____
8. At key moments in this story, I felt I knew exactly what the characters were going through. ____

9. While reading the story, I wanted the characters to succeed in achieving their goals. ____
10. When characters succeed I felt joy, but when they failed I was sad. ____

Part J

Instructions:

Think about the **emotions** you felt when you read this story and indicate **the extent to which the story made you feel different emotions** by writing a number between 0 to 100 in the space next to **EACH** question, where 0 = None of the emotion, **AND** 100 = The maximum amount of the emotion you could possibly feel.

1. Please indicate the extent to which the story made you feel fear. ____
2. Please indicate the extent to which the story made you feel frustration. ____
3. Please indicate the extent to which the story made you feel sadness. ____
4. Please indicate the extent to which the story made you feel worry. ____
5. Please indicate the extent to which the story made you feel hope. ____
6. Please indicate the extent to which the story made you feel happiness. ____

Part K

Instructions:

We would like to know a little bit about you. The information provided is completely anonymous and will be combined with information from all other participants in this study to provide a general description of study participants as a whole.

1. How old are you?
   a) 18 – 21 years____
   b) 22 – 25_____
   c) 26 - 29_____
   d) 30 or over____
2. What is your major?

_____

3. Year in school?

a) Freshman_____

b) Sophomore_____

c) Junior_____

d) Senior____

e) Other (specify)_____

4. Gender? Male_____

a) Female_____

b) Gender neutral____

c) Transgender___

d) I prefer not to answer_____

e) 5. With which ethnic group do you identify?

a) Asian/Pacific Islander____

b) Black/African-American____

c) Hispanic/Latino____

d) White/Caucasian____

e) Native American Indian____

f) Other (specify)_____

g) I prefer not to answer____

6. With which political philosophy do you **most** identify?

a) Democratic_____

b) Republican_____

c) Other (specify)_____

d) I prefer not to answer____

7. Which state (or country) do you consider

home?_____

8. Do you have a full or part-time job besides being a student? Yes_____ No_____

9. How do you pay for your personal healthcare needs.

a) I am covered under my parents' health insurance plan ___

b) I have my own health insurance__

c) I have Medicaid___

d) I have no health insurance___

e) Other (please specify) _____

f) I prefer not to answer _____

10. Which type of place attachment is **stronger** for you in terms of the Maryland/Virginia/DC area?

a) Goal/functional attachment_____

b) Emotional/symbolic attachment_____

11. Please give an estimate of your personal annual income_____

12. Please give an estimate of the total annual income of your parents_____

13. In which social class do you consider yourself?

a) Lower lower class___

b) Upper lower class___

c) Working class___

d) Middle class___

e) Upper middle class___

f) Lower upper class___

g) Upper upper class____

Part L

Instructions:

Please think about the story you just read, **especially the characters involved**, and indicate the extent of your agreement or disagreement with **EACH** of the following statements by writing a number between 0 and 100 next to **EACH** question, where 0 = Strongly disagree, **AND** 100 = Strongly agree.

1. The social class of the characters in this story is very similar to mine. ____
2. The status of the characters in this story is very different from mine. ____
3. The economic situation of the characters in this story is very different from mine. ____
4. The background of the characters in this story is very similar to mine. ____

5. The status of the characters in this story is very much like mine. ____
6. The characters are from a social class very different from mine. ____
7. The characters are from an economic situation very much like mine. ____
8. The background of the characters in this story is very different from mine. ____
9. The characters in this story and I come from a very similar geographic region. ____
10. The characters in this story and I have a lot in common. ____

Part M

Instructions:

Please think about the story you just read, **especially the placed described**, and indicate the extent of your agreement or disagreement with **EACH** of the following statements by writing a number between 0 and 100 next to **EACH** question, where 0 = Strongly disagree, **AND** 100 = Strongly agree.

10. The characters in this story live in a place very similar to where I currently live. ____
11. The characters in this story work in a place very different from where I attend college. ____
12. The characters in this story are from a community very similar to mine. ____
13. The college in this story is very different from mine. ____
14. The characters in this story live in a place very different from where I currently live. ____ The characters in this story work in a place very similar to where I attend college. ____
15. The characters in this story are from a community very different from mine. ____
16. The college in this story is very similar to mine. ____
17. I can identify with the work/school environment portrayed in this story. ____
18. I can identify with the residential community of the characters in this story. ____

FINAL PART

Before we told you what this study was all about, did you honestly:

(1) Think this as a real news story? Yes____ No____

Not sure ____

(2) Figure out the real purpose of the study? Yes____ No____

Not sure____

Appendix F: Study Messages

PILOT 2 - TESTING THE MESSAGES

Base Message - West Nile Virus

Please Note: The information in the base message is authentic and was taken from facts sheets produced mainly by the United States Centers for Disease Control (CDC). The information that comes after the base message is plausible, having been formulated based on various news stories and factual information, but the deception lies in the fact that the people mentioned are unreal and the series of events involving the people in the message were fabricated. The recommendations for reducing the risk are real. The sources of the photographs are below; some were manipulated specifically for the purpose of this research. The name of the message author was fabricated.

By Jessica Stephens

This past summer (2012) the U.S. saw its largest ever outbreak of West Nile Virus. The Centers for Disease Control (CDC) reported over 5000 cases of the disease in 48 states, including 219 deaths – all in 2012 alone. Humans contract the disease when they are bitten by mosquitoes that have fed on infected birds. Symptoms include swollen lymph nodes, body aches, fatigue, headache, fever, and skin rash.

About half of the West Nile Virus cases reported so far in 2012 have been of neuro-invasive forms such as meningitis and encephalitis, which may cause permanent brain damage. According to the CDC, "Symptoms of severe disease include headache, high fever, disorientation, coma, tremors, convulsions, muscle weakness, and paralysis."

People need to become educated about West Nile Virus because even though it is relatively seasonal, its consequences persist throughout the year. Furthermore, awareness must continue all year round so that by the time Spring and Summer arrive, people know how to reduce their risk of becoming affected.

THE TREATMENT GOES HERE

West Nile Virus

STORY #1:

- Low demographic similarity (Married Latino adults [with children] working custodial jobs)
- Low scene similarity (Small equestrian college/home in farming community, rural town)

STORY #2:

- High demographic similarity (Young, healthy college students)
- Low scene similarity (Small equestrian college/home in farming community, rural town)

STORY #3:

- Low demographic similarity (Married Latino adults [with children] working custodial jobs)
- High scene similarity (Large college campus/home in Metropolitan area)

STORY #4:

- High demographic similarity (Young, healthy college students)
- High scene similarity (Large college campus/home in Metropolitan area)

PHOTO SOURCES:

- *Mosquito Photo courtesy aNewsCafe.com*
- *Female cleaner Photo courtesy aisd.net*
- *Male cleaner Photo courtesy ed101.bu.edu*
- *College kids Photo courtesy idg-ed.com*
- *College Photo courtesy ohiouat.com*

WEST NILE VIRUS – CONSIDER YOUR RISK

NEWS STORY # 1

By Jessica Stephens

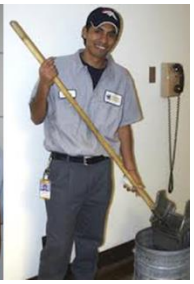
This past summer (2012) the U.S. saw its largest ever outbreak of West Nile Virus. The Centers for Disease Control (CDC) reported over 5000 cases of the disease in 48 states, including 219 deaths – all in 2012 alone. Humans contract the disease when they are bitten by mosquitoes that have fed on infected birds. Symptoms include swollen lymph nodes, body aches, fatigue, headache, fever, and skin rash.

About half of the West Nile Virus cases reported so far in 2012 have been of neuro-invasive forms such as meningitis and encephalitis, which may cause permanent brain damage. According to the CDC, "Symptoms of severe disease include headache, high fever, disorientation, coma, tremors, convulsions, muscle weakness, and paralysis."

People need to become educated about West Nile Virus because even though it is relatively seasonal, its consequences persist throughout the year. Furthermore, awareness must continue all year round so that by the time Spring and Summer arrive, people know how to reduce their risk of becoming infected.

Although children, the elderly, and people with compromised immune systems are at highest risk for contracting West Nile Virus, healthy parents and adults can also become victims as was the case with married couple Isabella and Alejandro Ramirez. Mr. & Mrs. Ramirez, both in their 40's, live in a small farming community in a rural town, and work as custodians at a small equestrian college (that is, related to horse-riding). They have five children and work hard at their jobs so that they can meet their children's needs.

One morning Isabella noticed a rash on her leg but thought it was an allergy to something she ate. Not long after, Alejandro developed severe headaches but thought he was just suffering from migraines. All seemed well until one morning while on her cleaning job at the small equestrian college, Isabella found that she was unable to hold the mop properly. Her muscles felt weak and she noticed her temperature was elevated. Not long after she lost consciousness and had to be rushed to the emergency room. By the time she regained consciousness, Alejandro had also been admitted to the same hospital. After several tests, scans, and analyses, they were both diagnosed with West Nile Encephalitis, a severe form of West Nile Virus that can be fatal. As healthy parents and adults, Isabella and Alejandro never imagined they were at risk for West Nile Virus, **but they were at risk**.

Today both Isabella and Alejandro are helping to spread the word about West Nile Virus to people in their small farming community. They remind others that during Spring, Summer and early Fall, they need to:

- ✓ Use bug spray
- ✓ Wear long sleeves at dusk and dawn
- ✓ Keep screens on their doors and windows
- ✓ Get rid of potential breeding sites for mosquitoes
- ✓ Actively seek more information about West Nile Virus

They know all too well that West Nile Virus and it severe forms (e.g., West Nile Encephalitis) can strike anyone, anywhere in the U.S., **EVEN YOU**. **Scientists say climate change will increase the risk of West Nile Virus. It is not early to prepare yourself and reduce your risk of becoming infected by West Nile Virus.**

WEST NILE VIRUS – CONSIDER YOUR RISK

NEWS STORY # 2

By Jessica Stephens

This past summer (2012) the U.S. saw its largest ever outbreak of West Nile Virus. The Centers for Disease Control (CDC) reported over 5000 cases of the disease in 48 states, including 219 deaths – all in 2012 alone. Humans contract the disease when they are bitten by mosquitoes that have fed on infected birds. Symptoms include swollen lymph nodes, body aches, fatigue, headache, fever, and skin rash.

About half of the West Nile Virus cases reported so far in 2012 have been of neuro-invasive forms such as meningitis and encephalitis, which may cause permanent brain damage. According to the CDC, "Symptoms of severe disease include headache, high fever, disorientation, coma, tremors, convulsions, muscle weakness, and paralysis."

People need to become educated about West Nile Virus because even though it is relatively seasonal, its consequences persist throughout the year. Furthermore, awareness must continue all year round so that by the time Spring and Summer arrive, people know how to reduce their risk of becoming infected.

Although children, the elderly, and people with compromised immune systems are at highest risk for contracting West Nile Virus, healthy college students can also become victims as was the case with college students Samantha Campbell and Thomas Johnson. Sam and Tom, both 18 – 21 years old, live in a small farming community in a rural town, and attend a small equestrian college (that is, related to horse-riding). They are both unmarried and study hard so they can graduate with good grades and get good jobs.

One morning Sam noticed a rash on her leg but thought it was an allergy to something she ate. Around that same time, Tom developed severe headaches but thought he was just suffering from migraines. All seemed well until one evening while studying for an exam, Sam found that she was unable to hold her textbook properly. Her muscles felt weak and she noticed her temperature was elevated. Not long after she lost consciousness and had to be rushed to the emergency room. By the time she regained consciousness, Tom had also been admitted to the same hospital. After several tests, scans, and analyses, they were both diagnosed with West Nile Encephalitis, a severe form of West Nile Virus that can be fatal. As healthy college students, Sam and Tom never imagined they were at risk for West Nile Virus, **but they were at risk**.

Today both Sam and Tom are helping to spread the word about West Nile Virus to people in their small farming community. They remind others that during Spring, Summer and early Fall, they need to:

- ✓ Use bug spray
- ✓ Wear long sleeves at dusk and dawn
- ✓ Keep screens on their doors and windows
- ✓ Get rid of potential breeding sites for mosquitoes
- ✓ Actively seek more information about West Nile Virus

They know all too well that West Nile Virus and it severe forms (e.g., West Nile Encephalitis) can strike anyone, anywhere in the U.S., **EVEN YOU**. **Scientists say climate change will increase the risk of West Nile Virus. It is not early to prepare yourself and reduce your risk of becoming infected by West Nile Virus.**

WEST NILE VIRUS – CONSIDER YOUR RISK

NEWS STORY # 3

By Jessica Stephens

This past summer (2012) the U.S. saw its largest ever outbreak of West Nile Virus. The Centers for Disease Control (CDC) reported over 5000 cases of the disease in 48 states, including 219 deaths – all in 2012 alone. Humans contract the disease when they are bitten by mosquitoes that have fed on infected birds. Symptoms include swollen lymph nodes, body aches, fatigue, headache, fever, and skin rash.

About half of the West Nile Virus cases reported so far in 2012 have been of neuro-invasive forms such as meningitis and encephalitis, which may cause permanent brain damage. According to the CDC, "Symptoms of severe disease include headache, high fever, disorientation, coma, tremors, convulsions, muscle weakness, and paralysis."

People need to become educated about West Nile Virus because even though it is relatively seasonal, its consequences persist throughout the year. Furthermore, awareness must continue all year round so that by the time Spring and Summer arrive, people know how to reduce their risk of becoming infected.

Although children, the elderly, and people with compromised immune systems are at highest risk for contracting West Nile Virus, healthy parents and adults can also become victims as was the case with married couple Isabella and Alejandro Ramirez. Mr. & Mrs. Ramirez, both in their 40's, live in a college town near to a large metropolitan area, and work as custodians at a large public research university. They have five children and work hard at their jobs so that they can meet their children's needs.

One morning Isabella noticed a rash on her leg but thought it was an allergy to something she ate. Not long after, Alejandro developed severe headaches but thought he was just suffering from migraines. All seemed well until one morning while on her cleaning job at the large public research university, Isabella found that she was unable to hold the mop properly. Her muscles felt weak and she noticed her temperature was elevated. Not long after she lost consciousness and had to be rushed to the emergency room. By the time she regained consciousness, Alejandro had also been admitted to the same hospital. After several tests, scans, and analyses, they were both diagnosed with West Nile Encephalitis, a severe form of West Nile Virus that can be fatal. As healthy parents and adults, Isabella and Alejandro never imagined they were at risk for West Nile Virus, **but they were at risk**.

Today both Isabella and Alejandro are helping to spread the word about West Nile Virus to people in the community around their college town. They remind others that during Spring, Summer and early Fall, they need to:

- ✓ Use bug spray
- ✓ Wear long sleeves at dusk and dawn
- ✓ Keep screens on their doors and windows
- ✓ Get rid of potential breeding sites for mosquitoes
- ✓ Actively seek more information about West Nile Virus

They know all too well that West Nile Virus and it severe forms (e.g., West Nile Encephalitis) can strike anyone, anywhere in the U.S., **EVEN YOU**. **Scientists say climate change will increase the risk of West Nile Virus. It is not early to prepare yourself and reduce your risk of becoming infected by West Nile Virus.**

WEST NILE VIRUS – CONSIDER YOUR RISK

NEWS STORY # 4

By Jessica Stephens

This past summer (2012) the U.S. saw its largest ever outbreak of West Nile Virus. The Centers for Disease Control (CDC) reported over 5000 cases of the disease in 48 states, including 219 deaths – all in 2012 alone. Humans contract the disease when they are bitten by mosquitoes that have fed on infected birds. Symptoms include swollen lymph nodes, body aches, fatigue, headache, fever, and skin rash.

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One morning Sam noticed a rash on her leg but thought it was an allergy to something she ate. Around that same time, Tom developed severe headaches but thought he was just suffering from migraines. All seemed well until one evening while studying for an exam, Sam found that she was unable to hold her textbook properly. Her muscles felt weak and she noticed her temperature was elevated. Not long after she lost consciousness and had to be rushed to the emergency room. By the time she regained consciousness, Tom had also been admitted to the same hospital. After several tests, scans, and analyses, they were both diagnosed with West Nile Encephalitis, a severe form of West Nile Virus that can be fatal. As healthy college students Sam and Tom never imagined they were at risk for West Nile Virus, **but they were at risk**.

Today both Sam and Tom are helping to spread the word about West Nile Virus to people on their college campus. They remind others that during Spring, Summer and early Fall, they need to:

- ✓ Use bug spray
- ✓ Wear long sleeves at dusk and dawn
- ✓ Keep screens on their doors and windows
- ✓ Get rid of potential breeding sites for mosquitoes
- ✓ Actively seek more information about West Nile Virus

They know all too well that West Nile Virus and it severe forms (e.g., West Nile Encephalitis) can strike anyone, anywhere in the U.S., **EVEN YOU**. **Scientists say climate change will increase the risk of West Nile Virus. It is not early to prepare yourself and reduce your risk of becoming infected by West Nile Virus.**

Base Message – Drought

Please Note: The information in the base message is authentic and was taken from facts sheets produced mainly by the United States National Oceanic and Atmospheric Administration (NOAA). The information that comes after the base message is plausible, having been formulated based on various news stories and factual information, but the deception lies in the fact that the people mentioned are unreal and the series of events involving the people in the message were fabricated. The recommendations for reducing the risk are real. The sources of the photographs are below; some were manipulated specifically for the purpose of this research. The name of the message author was fabricated.

By Jessica Stephens

This past summer the National Oceanic and Atmospheric Administration (NOAA) reported that on a national level, the 2012 drought in the U.S. has been the worst in 50 years. According to the NOAA's drought experts, "about 64.6 percent of the U.S. experienced moderate to exceptional drought by the end of September, 2012." Drought occurs naturally because of low rainfall levels and can have devastating impacts on health and the environment.

Direct health effects include water contamination because of lower water levels and therefore higher concentration of pollutants. Drought also increases the risk of waterborne diseases caused by parasites, viruses and bacteria. According to the Department of Health, symptoms of waterborne diseases "may include nausea or vomiting, abdominal cramping, diarrhea, muscle ache, or fever." Environmental effects include the death of plants and animals, wildfires, and loss of rivers and streams.

People need to become educated about drought because even though it occurs when there is low rainfall, its consequences persist throughout the year. Furthermore, awareness must continue all year round so that whenever there is a drought, people know how to reduce their risk of becoming victims of its consequences.

THE TREATMENT GOES HERE

Drought

STORY #5:

- Low demographic similarity (Married Latino adults [with children] working custodial jobs)
- Low scene similarity (Small equestrian college/home in farming community, rural town)

STORY #6:

- High demographic similarity (Young, healthy college students)

- Low scene similarity (Small equestrian college/home in farming community, rural town)

STORY #7:
- Low demographic similarity (Married Latino adults [with children] working custodial jobs)
- High scene similarity (Large college campus/home in Metropolitan area)

STORY #8:
- High demographic similarity (Young, healthy college students)
- High scene similarity (Large college campus/home in Metropolitan area)

PHOTO SOURCES:
- *Drought Photo courtesy Wikipedia*
- *Female cleaner Photo courtesy aisd.net*
- *Male cleaner Photo courtesy ed101.bu.edu*
- *College kids Photo courtesy idg-ed.com*
- *College Photo courtesy ohiouat.com*

DROUGHT – CONSIDER YOUR RISK

NEWS STORY # 5

By Jessica Stephens

This past summer the National Oceanic and Atmospheric Administration (NOAA) reported that on a national level, the 2012 drought in the U.S. has been the worst in 50 years. According to the NOAA's drought experts, "about 64.6 percent of the U.S. experienced moderate to exceptional drought by the end of September, 2012." Drought occurs naturally because of low rainfall levels and can have devastating impacts on health and the environment.

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People need to become educated about drought because even though it occurs when there is low rainfall, its consequences persist throughout the year. Furthermore, awareness must continue all year round so that whenever there is a drought, people know how to reduce their risk of becoming victims of its consequences.

Although children, the elderly, and people with compromised immune systems are at highest risk for drought related waterborne diseases, healthy parents and adults can also become victims as was the case with married couple Isabella and Alejandro Ramirez. Mr. & Mrs. Ramirez, both in their 40's, live in a small farming community in a rural town, and work as custodians at a small equestrian college (that is, related to horse-riding). They have five children and work hard at their jobs so that they can meet their children's needs.

For many weeks there had been no rain where the Ramirez family lives. The earth was parched and cracked, and farmers lost just about all their crops and livestock. The community lake was dry, and a big wildfire had destroyed a favorite community recreational area and its resident plants and animals. One morning Isabella felt nauseous but attributed it to something she ate. Not long after, Alejandro developed severe muscle aches but thought it was related to something he lifted on the job. All seemed well until one morning while on her cleaning job at the small equestrian college, Isabella found that she was unable to hold the mop properly. Her muscles felt weak and she noticed her temperature was elevated. Not long after she lost consciousness and had to be rushed to the emergency room. By the time she regained consciousness, Alejandro had also been admitted to the same hospital. After several tests, scans, and analyses, they were both

diagnosed with Cryptosporidiosis (a.k.a. Crypto), a serious waterborne disease that can be fatal. As healthy parents and adults Isabella and Alejandro never imagined they were at risk for drought related diseases, **<u>but they were at risk</u>**.

Today both Isabella and Alejandro are helping to spread the word about drought to people in their small farming community. They remind others that wasting water can exacerbate the personal effects of drought and that they need to:

- ✓ Close the tap when brushing teeth
- ✓ Take shorter showers
- ✓ Consume only bottled water (even in food) when water levels are low
- ✓ Don't flush toilets after urinating (let yellow mellow, flush down brown)
- ✓ Actively seek more information about drought

They know all too well that drought and its serious consequences (e.g., high food costs) can strike anywhere and therefore anyone in the U.S., **<u>EVEN YOU</u>**. **Scientists say climate change will increase the risk of drought. It is not early to prepare yourself and help reduce your personal risk of being adversely affected by drought.**

DROUGHT – CONSIDER YOUR RISK

NEWS STORY # 6

By Jessica Stephens

This past summer the National Oceanic and Atmospheric Administration (NOAA) reported that on a national level, the 2012 drought in the U.S. has been the worst in 50 years. According to the NOAA's drought experts, "about 64.6 percent of the U.S. experienced moderate to exceptional drought by the end of September, 2012." Drought occurs naturally because of low rainfall levels and can have devastating impacts on health and the environment.

Direct health effects include water contamination because of lower water levels and therefore higher concentration of pollutants. Drought also increases the risk of waterborne diseases caused by parasites, viruses and bacteria. According to the Department of Health, symptoms of waterborne diseases "may include nausea or vomiting, abdominal cramping, diarrhea, muscle ache, or fever." Environmental effects include the death of plants and animals, wildfires, and loss of rivers and streams.

People need to become educated about drought because even though it occurs when there is low rainfall, its consequences persist throughout the year. Furthermore, awareness must continue all year round so that whenever there is a drought, people know how to reduce their risk of becoming victims of its consequences.

Although children, the elderly, and people with compromised immune systems are at highest risk for drought related waterborne diseases, healthy college students can also become victims as was the case with college students Samantha Campbell and Thomas Johnson. Sam and Tom, both 18 – 21 years old, live in a small farming community in a rural town, and attend a small equestrian college (that is, related to horse-riding). They are both unmarried and study hard so they can graduate with good grades and get good jobs.

For many weeks there had been no rain where Sam and Tom live. The earth was parched and cracked, and farmers lost just about all their crops and livestock. The community lake was dry, and a big wildfire had destroyed a favorite community recreational area and its resident plants and animals. One morning Sam felt nauseous but attributed it to something she ate. Not long after, Tom developed severe muscle aches but thought it was related to something he lifted for his professor. All seemed well until one evening while studying for an exam, Sam found that she was unable to hold her textbook properly. Her muscles felt weak and she noticed her temperature was elevated. Not long after she lost consciousness and had to be rushed to the emergency room. By the time she regained consciousness, Tom had also been admitted to the same hospital. After several tests,

scans, and analyses, they were both diagnosed with Cryptosporidiosis (a.k.a. Crypto), a serious waterborne disease that can be fatal. As healthy college students Sam and Tom never imagined they were at risk for drought related diseases, **<u>but they were at risk</u>**.

Today both Sam and Tom are helping to spread the word about drought to people in their small farming community. They remind others that wasting water can exacerbate the personal effects of drought and that they need to:

- ✓ Close the tap when brushing teeth
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- ✓ Consume only bottled water (even in food) when water levels are low
- ✓ Don't flush toilets after urinating (let yellow mellow, flush down brown)
- ✓ Actively seek more information about drought

They know all too well that drought and its serious consequences (e.g., high food costs) can strike anywhere and therefore anyone in the U.S., **<u>EVEN YOU</u>**. **Scientists say climate change will increase the risk of drought. It is not early to prepare yourself and help reduce your personal risk of being adversely affected by drought.**

DROUGHT – CONSIDER YOUR RISK

NEWS STORY # 7

By Jessica Stephens

This past summer the National Oceanic and Atmospheric Administration (NOAA) reported that on a national level, the 2012 drought in the U.S. has been the worst in 50 years. According to the NOAA's drought experts, "about 64.6 percent of the U.S. experienced moderate to exceptional drought by the end of September, 2012." Drought occurs naturally because of low rainfall levels and can have devastating impacts on health and the environment.

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People need to become educated about drought because even though it occurs when there is low rainfall, its consequences persist throughout the year. Furthermore, awareness must continue all year round so that whenever there is a drought, people know how to reduce their risk of becoming victims of its consequences.

Although children, the elderly, and people with compromised immune systems are at highest risk for drought related waterborne diseases, healthy parents and adults can also become victims as was the case with married couple Isabella and Alejandro Ramirez. Mr. & Mrs. Ramirez, both in their 40's, live in a college town near to a large metropolitan area, and work as custodians at a large public research university. They have five children and work hard at their jobs so that they can meet their children's needs.

For many weeks there had been no rain where the Ramirez family lives. The earth was parched and cracked, lawns were brown, and yards were dusty. The lake in their college town was dry, and a big wildfire had destroyed a favorite recreational area and its resident plants and animals. One morning Isabella felt nauseous but attributed it to something she ate. Not long after, Alejandro developed severe muscle aches but thought it was related to something he lifted on the job. All seemed well until one morning while on her cleaning job at the large public university, Isabella found that she was unable to hold the mop properly. Her muscles felt weak and she noticed her temperature was elevated. Not long after she lost consciousness and had to be rushed to the emergency room. By the time she regained consciousness, Alejandro had also been admitted to the same hospital. After several tests, scans, and analyses, they were both diagnosed with Cryptosporidiosis (a.k.a. Crypto), a serious waterborne disease that can be fatal. As

healthy parents and adults Isabella and Alejandro never imagined they were at risk for drought related diseases, **<u>but they were at risk</u>**.

Today both Isabella and Alejandro are helping to spread the word about drought to people in their community. They remind others that wasting water can exacerbate the personal effects of drought and that they need to:

- ✓ Close the tap when brushing teeth
- ✓ Take shorter showers
- ✓ Consume only bottled water (even in food) when water levels are low
- ✓ Don't flush toilets after urinating (let yellow mellow, flush down brown)
- ✓ Actively seek more information about drought

They know all too well that drought and its serious consequences (e.g., high food costs) can strike anywhere and therefore anyone in the U.S., **<u>EVEN YOU</u>**. **Scientists say climate change will increase the risk of drought. It is not early to prepare yourself and help reduce your personal risk of being adversely affected by drought.**

DROUGHT – CONSIDER YOUR RISK

NEWS STORY # 8

By Jessica Stephens

This past summer the National Oceanic and Atmospheric Administration (NOAA) reported that on a national level, the 2012 drought in the U.S. has been the worst in 50 years. According to the NOAA's drought experts, "about 64.6 percent of the U.S. experienced moderate to exceptional drought by the end of September, 2012." Drought occurs naturally because of low rainfall levels and can have devastating impacts on health and the environment.

Direct health effects include water contamination because of lower water levels and therefore higher concentration of pollutants. Drought also increases the risk of waterborne diseases caused by parasites, viruses and bacteria. According to the Department of Health, symptoms of waterborne diseases "may include nausea or vomiting, abdominal cramping, diarrhea, muscle ache, or fever." Environmental effects include the death of plants and animals, wildfires, and loss of rivers and streams.

People need to become educated about drought because even though it occurs when there is low rainfall, its consequences persist throughout the year. Furthermore, awareness must continue all year round so that whenever there is a drought, people know how to reduce their risk of becoming victims of its consequences.

Although children, the elderly, and people with compromised immune systems are at highest risk for drought related waterborne diseases, healthy college students can also become victims as was the case with college students Samantha Campbell and Thomas Johnson. Sam and Tom, both 18 – 21 years old, live in a college town near to a large metropolitan area, and attend a large public research university. They are both unmarried and study hard so they can graduate with good grades and get good jobs.

For many weeks there had been no rain where Sam and Tom live. The earth was parched and cracked, lawns were brown, and yards were dusty. The lake in their college town was dry, and a big wildfire had destroyed a favorite recreational area and its resident plants and animals. One morning Sam felt nauseous but attributed it to something she ate. Not long after, Tom developed severe muscle aches but thought it was related to something he lifted for his professor. All seemed well until one evening while studying for an exam, Sam found that she was unable to hold her textbook properly. Her muscles felt weak and she noticed her temperature was elevated. Not long after she lost consciousness and had to be rushed to the emergency room. By the time she regained consciousness, Tom had also been admitted to the same hospital. After several tests, scans, and analyses, they were both diagnosed with Cryptosporidiosis (a.k.a. Crypto), a serious waterborne disease

that can be fatal. As healthy college students Sam and Tom never imagined they were at risk for drought related diseases, **<u>but they were at risk</u>**.

Today both Sam and Tom are helping to spread the word about drought to people on their college campus. They remind others that wasting water can exacerbate the personal effects of drought and that they need to:

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They know all too well that drought and its serious consequences (e.g., high food costs) can strike anywhere and therefore anyone in the U.S., **<u>EVEN YOU</u>**. **Scientists say climate change will increase the risk of drought. It is not early to prepare yourself and help reduce your personal risk of being adversely affected by drought.**

Appendix G: Main Study Messages

Flyer 1

Drought Related Health Effects

YOUR RISK COULD BE HIGHER THAN YOU THINK

Meet Isabella & Alejandro

Isabella and Alejandro are married and are both in their 40s. They live in a small farming community in a rural town, and work as custodians at a small equestrian college. They have five children and work hard at their jobs so that they can meet their children's needs. For many weeks there had been no rain where they live. Their community was suffering from severe drought. One morning Isabella felt nauseous but attributed it to something she ate. Not long after, Alejandro developed severe muscle aches but thought it was related to something he lifted on the job. All seemed well until one morning while on her cleaning job, Isabella found that she was unable to hold the mop properly. Her muscles felt weak and she noticed her temperature was elevated. Not long after she lost consciousness and had to be rushed to the emergency room. By the time she regained consciousness, Alejandro had also been admitted to the same hospital. After several tests, scans, and analyses, they were both diagnosed with Cryptosporidiosis (a.k.a. Crypto), a serious waterborne disease that can be fatal. As healthy parents and adults Isabella and Alejandro never imagined they were at risk for drought related diseases, **but they were at risk, and YOU could be too**. **REDUCE YOUR RISK**:

- ✓ *Don't drink tap water during a drought*
- ✓ *Stay hydrated at all times*
- ✓ *Use boiled water when preparing food*
- ✓ *Increase water conservation*
- ✓ *Seek more info. about drought*

Isabella & Alejandro work here & live close by

Drought Season is Almost Here: *Prepare Yourself!*

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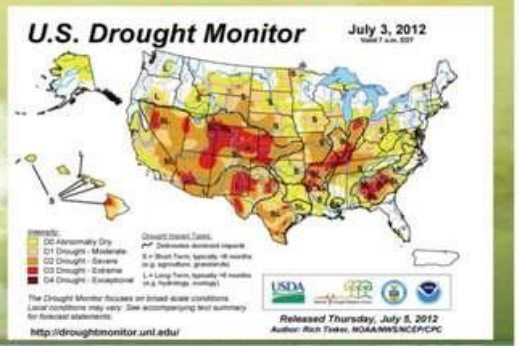
Scientists say Summer 2013 may be worse.



Scientists report that **climate change** has led to an increase in the intensity of natural disasters like **drought** and tornadoes, and diseases like influenza and West Nile Virus. *(Intergovernmental Panel on Climate Change, 2011)*

Flyer 2

Drought Related Health Effects

YOUR RISK COULD BE HIGHER THAN YOU THINK

Meet Sam and Tom, & Friends

Sam and Tom are typical college students in the 18 – 21 age group. They live in a small farming community in a rural town, and attend a small equestrian college. They are both unmarried and study hard so they can graduate with good grades and get good jobs. For many weeks there had been no rain where Sam and Tom live. Their community was suffering from severe drought. One morning Sam felt nauseous but attributed it to something she ate. Not long after, Tom developed severe muscle aches but thought it was related to something he lifted for his professor. All seemed well until one evening while studying for an exam, Sam found that she was unable to hold her textbook properly. Her muscles felt weak and she noticed her temperature was elevated. Not long after she lost consciousness and had to be rushed to the emergency room. By the time she regained consciousness, Tom had also been admitted to the same hospital. After several tests, scans, and analyses, they were both diagnosed with Cryptosporidiosis (a.k.a. Crypto), a serious waterborne disease that can be fatal. As healthy college students Sam and Tom never imagined they were at risk for drought related diseases, **but they were at risk, and YOU could be too.** **REDUCE YOUR RISK:**

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Sam and Tom attend college here

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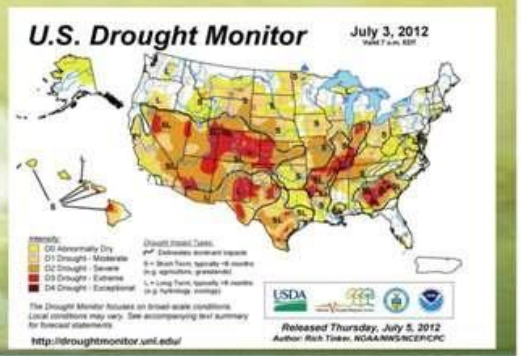

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Flyer 3

Drought Related Health Effects

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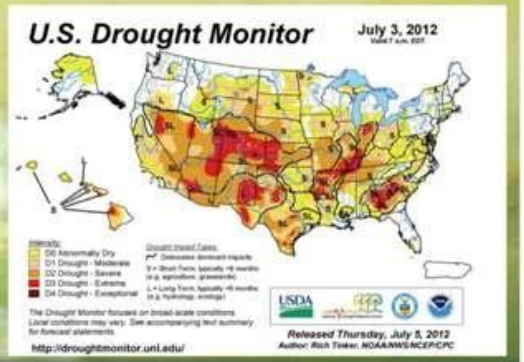

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Flyer 4

Drought Related Health Effects

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Drought Season is Almost Here: *Prepare Yourself!*

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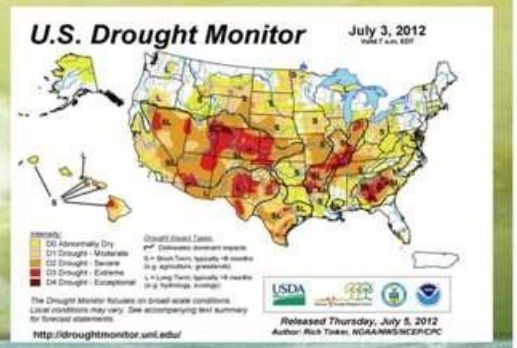

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Flyer 5

Drought in Your Community

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REDUCE THE IMPACT OF DROUGHT ON YOUR COMMUNITY:

- ✓ *Increase water conservation*
- ✓ *Join an environmental group*
- ✓ *Seek more info. about drought*
- ✓ *Educate others about drought*
- ✓ *Lobby for drought preparation policies*

Isabella & Alejandro work here & live close by

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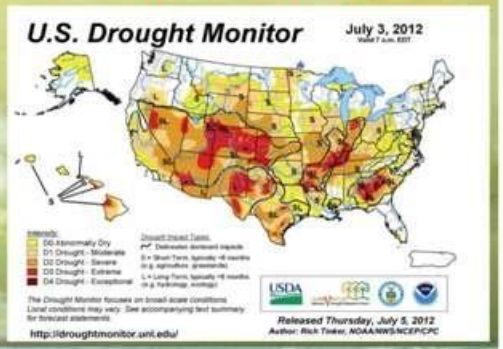

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Flyer 6

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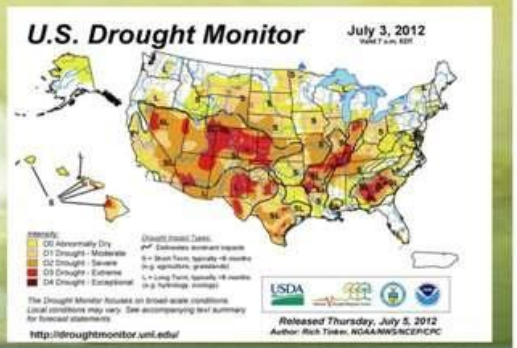

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Flyer 7

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Isabella and Alejandro are married and are both in their 40s. They live in a college town near to a large metropolitan area, and work as custodians at a large public research university. They have five children and work hard at their jobs so that they can meet their children's needs. For many weeks there had been no rain where they live. Their town and surrounding areas were suffering from a severe drought. One morning Isabella and Alejandro opened the tap to find that there was no water. They weren't too alarmed but when they returned from work that evening there was still no water. Only then did they remember that it was actually the start of an area-wide water rationing system that had been implemented to conserve water. As the weeks progressed, the drought only got worse. The college campus where they worked was dry and dusty, and water fountains were turned off. A wildfire had destroyed a favorite recreational area and its resident plants and animals. The vegetation in the neighborhood parks was as crisp as breakfast toast, tempting more wildfires. The death toll of the area's meager wildlife continued to rise because of food and water shortage. Isabella and Alejandro never imagined that their community was at risk for drought, **but it was, and YOURS could be too.** **REDUCE THE IMPACT OF DROUGHT ON YOUR COMMUNITY:**

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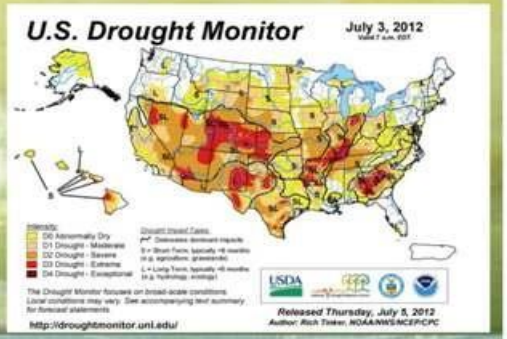

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Flyer 8

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Sam and Tom attend college here

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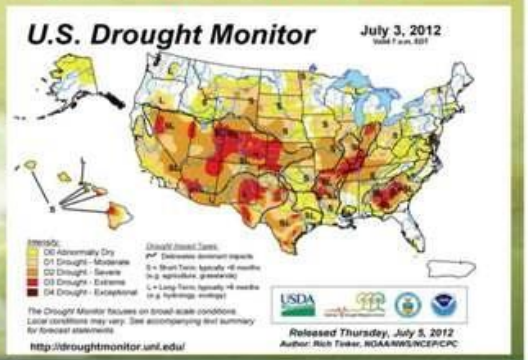

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Appendix H: Estimated Marginal Means for Risk Frame × Demographic Similarity × Scene Similarity ANCOVA

1. Estimated marginal means for risk perception, narrative persuasion, and perceived similarity

Outcome Variable	Risk Frame Category	Demographic Similarity Category	Scene Similarity Category	Estimated Marginal Means	Standard Error
Susceptibility	Health	Low	Low	33.764	2.205
			High	35.061	2.206
		High	Low	36.875	2.140
			High	34.753	2.349
	Environment	Low	Low	37.929	2.238
			High	41.622	1.966
		High	Low	40.262	2.083
			High	40.173	2.242
Severity	Health	Low	Low	67.826	2.059
			High	70.466	2.061
		High	Low	72.742	1.999
			High	65.765	2.195
	Environment	Low	Low	69.510	2.091
			High	71.423	1.837
		High	Low	67.075	1.946
			High	65.652	2.094
Identification	Health	Low	Low	46.915	2.427
			High	56.349	2.429
		High	Low	51.369	2.356
			High	52.157	2.586
	Environment	Low	Low	53.622	2.464
			High	51.690	2.165
		High	Low	53.253	2.294
			High	49.184	2.468
Transportation	Health	Low	Low	37.033	2.286
			High	42.313	2.287
		High	Low	33.760	2.218
			High	37.909	2.436
	Environment	Low	Low	38.888	2.321
			High	33.462	2.038
		High	Low	37.667	2.160
			High	36.366	2.324
Self-Referencing	Health	Low	Low	32.484	2.215

Outcome Variable	Risk Frame Category	Demographic Similarity Category	Scene Similarity Category	Estimated Marginal Means	Standard Error
			High	34.133	2.217
	Environment	High	Low	27.791	2.150
			High	37.931	2.361
		Low	Low	28.355	2.249
			High	29.320	1.976
		High	Low	33.062	2.094
			High	35.667	2.253
Perceived Demographic Similarity	Health	Low	Low	28.228	2.305
			High	26.945	2.307
		High	Low	46.263	2.237
			High	63.199	2.457
	Environment	Low	Low	31.818	2.340
			High	27.782	2.056
		High	Low	43.133	2.179
			High	55.218	2.344
Perceived Scene Similarity	Health	Low	Low	28.506	2.234
			High	53.357	2.236
		High	Low	37.750	2.168
			High	60.126	2.381
	Environment	Low	Low	30.866	2.268
			High	43.289	1.993
		High	Low	32.776	2.112
			High	57.504	2.272

Note. Covariates appearing in the model are evaluated at the following values: Personal relevance = 45.730, Optimistic Bias = 28.051, Climate Change= 57.543

2. Estimated marginal means for behavioral intention, behavioral expectation, and response efficacy

Outcome Variable	Risk Frame Category	Demographic Similarity Category	Scene Similarity Category	Estimated Marginal Means	Standard Error
Behavioral Intention (Conserve water)[a]	Health	Low	Low	72.388	3.159
			High	60.035	3.161
		High	Low	64.669	3.066
			High	58.735	3.366
	Environment	Low	Low	51.059	3.207
			High	53.878	2.834
		High	Low	58.083	3.004
			High	53.418	3.213
Behavioral Intention (Seek information one week)[b]	Health	Low	Low	38.258	3.195
			High	30.177	3.197
		High	Low	28.868	3.100
			High	31.177	3.404
	Environment	Low	Low	28.447	3.243
			High	31.331	2.885
		High	Low	29.668	3.039
			High	27.017	3.248
Behavioral Intention (Seek information when there is time)[c]	Health	Low	Low	38.731	3.212
			High	39.611	3.214
		High	Low	37.098	3.117
			High	34.929	3.423
	Environment	Low	Low	37.248	3.261
			High	37.425	2.865
		High	Low	34.989	3.035
			High	35.973	3.290
Behavioral Expectation (Conserve water)[d]	Health	Low	Low	60.652	3.497
			High	49.458	3.500
		High	Low	52.840	3.394
			High	47.807	3.727
	Environment	Low	Low	44.303	3.551
			High	48.907	3.119
		High	Low	47.383	3.327
			High	50.258	3.556
Behavioral Expectation	Health	Low	Low	31.939	3.337
			High	33.320	3.340

Outcome Variable	Risk Frame Category	Demographic Similarity Category	Scene Similarity Category	Estimated Marginal Means	Standard Error
(Seek information one week)[e]		High	Low	30.643	3.239
			High	26.504	3.556
	Environment	Low	Low	30.557	3.388
			High	33.879	2.976
		High	Low	26.505	3.154
			High	30.776	3.394
Behavioral Expectation (Seek information when there is time)[f]	Health	Low	Low	31.939	3.337
			High	33.320	3.340
		High	Low	30.643	3.239
			High	26.504	3.556
	Environment Health	Low	Low	30.557	3.388
			High	33.879	2.976
		High	Low	26.505	3.154
		Low	Low	30.776	3.394
Response Efficacy (Conserve water)[g]	Health	Low	Low	67.419	3.439
			High	64.954	3.390
		High	Low	63.170	3.287
			High	54.875	3.641
	Environment	Low	Low	63.677	3.439
			High	62.496	3.040
		High	Low	61.984	3.202
			High	62.854	3.445
Response Efficacy (Seek information one week)[h]	Health	Low	Low	45.794	3.544
			High	46.996	3.546
		High	Low	44.996	3.439
			High	46.333	3.777
	Environment	Low	Low	32.168	3.598
			High	33.407	3.180
		High	Low	23.848	3.350
			High	31.891	3.604
Response Efficacy (Seek information when there is time)[i]	Health	Low	Low	44.515	3.497
			High	47.271	3.499
		High	Low	44.183	3.393
			High	46.367	3.726
	Environment	Low	Low	32.364	3.550
			High	33.695	3.138

Outcome Variable	Risk Frame Category	Demographic Similarity Category	Scene Similarity Category	Estimated Marginal Means	Standard Error
		High	Low	24.758	3.305
			High	35.838	3.556

Note. Covariates appearing in the model are evaluated at the following values:

a. Personal relevance = 45.646, Optimistic Bias = 28.177, Climate Change = 57.530
b. Personal relevance = 45.690, Optimistic Bias = 28.087, Climate Change = 57.428
c. Personal relevance = 45.814, Optimistic Bias = 28.103, Climate Change = 57.649
d. Personal relevance = 45.708, Optimistic Bias = 28.121, Climate Change= 57.502
e. Personal relevance = 45.793, Optimistic Bias = 27.906, Climate Change= 57.654
f. Personal relevance = 45.730, Optimistic Bias = 28.051, Climate Change= 57.543
g. Personal relevance = 45.697, Optimistic Bias = 28.242, Climate Change= 57.476
h. Personal relevance = 45.697, Optimistic Bias = 28.242, Climate Change= 57.522
i. Personal relevance = 45.683, Optimistic Bias = 28.213, Climate Change= 57.522

Appendix I: Estimated Marginal Means for Personal Relevance × Risk Frame × Demographic Similarity × Scene Similarity ANOVA

Outcome Variable	Personal Relevance Category	Risk Frame Category	Demographic Similarity Category	Scene Similarity Category	Estimated Marginal Means	Standard Error
Susceptibility	Low	Health	Low	Low	22.477	3.749
				High	23.014	3.541
			High	Low	24.450	3.406
				High	23.757	3.694
		Environment	Low	Low	31.814	3.641
				High	27.500	3.109
			High	Low	29.287	3.694
				High	26.358	3.932
	High	Health	Low	Low	44.779	3.641
				High	46.048	3.868
			High	Low	49.228	3.694
				High	48.509	4.070
		Environment	Low	Low	49.581	3.694
				High	57.525	3.406
			High	Low	55.268	3.364
				High	52.890	3.694
Severity	Low	Health	Low	Low	59.098	3.334
				High	62.270	3.149
			High	Low	67.500	3.028
				High	55.000	3.285
		Environment	Low	Low	65.086	3.238
				High	63.734	2.765
			High	Low	60.154	3.285
				High	54.158	3.497
	High	Health	Low	Low	77.629	3.238
				High	79.129	3.440
			High	Low	79.287	3.285
				High	77.188	3.620
		Environment	Low	Low	78.904	3.285
				High	78.300	3.028
			High	Low	75.165	2.991
				High	73.081	3.285
Identification	Low	Health	Low	Low	42.860	3.643
				High	52.517	3.440
			High	Low	42.044	3.309
				High	43.974	3.589
		Environment	Low	Low	48.818	3.537

Outcome Variable	Personal Relevance Category	Risk Frame Category	Demographic Similarity Category	Scene Similarity Category	Estimated Marginal Means	Standard Error
				High	45.625	3.021
			High	Low	46.217	3.589
				High	40.796	3.821
			Low	Low	53.254	3.537
		Health		High	58.847	3.759
			High	Low	61.735	3.589
	High			High	60.531	3.955
			Low	Low	61.989	3.589
		Environment		High	55.897	3.309
			High	Low	61.134	3.268
				High	55.257	3.589
Transportation	Low	Health	Low	Low	31.080	3.475
				High	35.439	3.282
			High	Low	21.341	3.157
				High	29.504	3.424
		Environment	Low	Low	31.764	3.374
				High	23.534	2.881
			High	Low	29.438	3.424
				High	22.800	3.645
	High	Health	Low	Low	44.707	3.374
				High	48.052	3.586
			High	Low	49.092	3.424
				High	47.098	3.773
		Environment	Low	Low	49.592	3.424
				High	43.147	3.157
			High	Low	47.463	3.118
				High	47.577	3.424
Self-Referencing	Low	Health	Low	Low	24.212	3.482
				High	23.146	3.289
			High	Low	16.070	3.163
				High	31.465	3.431
		Environment	Low	Low	18.846	3.382
				High	22.517	2.888
			High	Low	23.671	3.431
				High	23.493	3.652
	High	Health	Low	Low	40.886	3.382
				High	43.232	3.593
			High	Low	42.288	3.431
				High	44.921	3.781
		Environment	Low	Low	39.994	3.431
				High	36.485	3.163

Outcome Variable	Personal Relevance Category	Risk Frame Category	Demographic Similarity Category	Scene Similarity Category	Estimated Marginal Means	Standard Error
			High	Low	45.122	3.124
				High	46.447	3.431
Perceived Demographic Similarity	Low	Health	Low	Low	26.152	3.354
				High	23.294	3.168
			High	Low	46.742	3.047
				High	63.144	3.304
		Environment	Low	Low	29.317	3.257
				High	19.940	2.781
			High	Low	44.101	3.304
				High	54.730	3.518
	High	Health	Low	Low	29.863	3.257
				High	29.953	3.461
			High	Low	46.905	3.304
				High	60.079	3.641
		Environment	Low	Low	34.935	3.304
				High	37.478	3.047
			High	Low	43.995	3.009
				High	56.961	3.304
Perceived Scene Similarity	Low	Health	Low	Low	25.490	3.319
				High	49.722	3.134
			High	Low	34.795	3.014
				High	57.759	3.269
		Environment	Low	Low	27.616	3.222
				High	42.045	2.752
			High	Low	31.971	3.269
				High	57.930	3.480
	High	Health	Low	Low	30.031	3.222
				High	55.091	3.424
			High	Low	41.072	3.269
				High	60.864	3.603
	Low	Environment	Low	Low	34.909	3.269
				High	45.711	3.014
		Health	High	Low	35.647	2.977
			Low	Low	59.045	3.269
Behavioral Intention (Conserve water)	Low	Health	Low	Low	70.212	4.744
				High	49.649	4.481
			High	Low	58.075	4.309
				High	47.471	4.674
		Environment	Low	Low	41.971	4.607
				High	41.188	3.934
			High	Low	43.294	4.674

Outcome Variable	Personal Relevance Category	Risk Frame Category	Demographic Similarity Category	Scene Similarity Category	Estimated Marginal Means	Standard Error
Behavioral Intention (Seek information in one week)	High	Health	Low	High	36.033	4.976
				Low	76.343	4.607
			High	High	72.516	4.895
				Low	72.824	4.674
		Environment	Low	High	70.714	5.151
				Low	62.676	4.674
			High	High	66.923	4.364
				Low	73.175	4.309
				High	66.206	4.674
	Low	Health	Low	Low	29.667	4.793
				High	13.622	4.526
			High	Low	18.750	4.353
				High	19.206	4.722
		Environment	Low	Low	20.171	4.654
				High	20.170	4.016
			High	Low	15.500	4.722
				High	12.467	5.027
	High	Health	Low	Low	46.629	4.654
				High	46.161	4.945
			High	Low	41.500	4.722
				High	43.929	5.203
		Environment	Low	Low	42.000	4.722
				High	43.846	4.409
			High	Low	44.625	4.353
				High	38.765	4.722
Behavioral Intention (Seek information when there is time)	Low	Health	Low	Low	32.970	4.881
				High	22.000	4.610
			High	Low	25.600	4.434
				High	25.441	4.809
		Environment	Low	Low	23.971	4.740
				High	24.729	4.047
			High	Low	17.235	4.809
				High	17.138	5.207
	High	Health	Low	Low	47.429	4.740
				High	56.097	5.036
			High	Low	50.735	4.809
				High	47.143	5.299
		Environment	Low	Low	52.441	4.809
				High	51.025	4.434
			High	Low	52.366	4.379
				High	51.059	4.809

Outcome Variable	Personal Relevance Category	Risk Frame Category	Demographic Similarity Category	Scene Similarity Category	Estimated Marginal Means	Standard Error
Behavioral Expectation (Conserve water)	Low	Health	Low	Low	55.515	5.243
				High	37.757	4.951
			High	Low	48.100	4.762
				High	34.941	5.165
		Environment	Low	Low	41.457	5.091
				High	36.688	4.347
			High	Low	31.706	5.165
				High	30.267	5.499
	High	Health	Low	Low	66.971	5.091
				High	62.323	5.409
			High	Low	59.941	5.165
				High	64.179	5.692
		Environment	Low	Low	53.000	5.165
				High	60.275	4.762
			High	Low	62.750	4.762
				High	65.206	5.165
Behavioral Expectation (Seek information in one week)	Low	Health	Low	Low	16.485	4.504
				High	15.919	4.253
			High	Low	9.375	4.091
				High	8.794	4.437
		Environment	Low	Low	14.829	4.373
				High	15.458	3.734
			High	Low	9.333	4.504
				High	9.500	4.724
	High	Health	Low	Low	40.657	4.373
				High	39.387	4.647
			High	Low	37.206	4.437
				High	43.571	4.889
		Environment	Low	Low	35.971	4.437
				High	36.974	4.143
			High	Low	34.146	4.041
				High	36.706	4.437
Behavioral Expectation (Seek information when there is time)	Low	Health	Low	Low	20.939	4.923
				High	19.973	4.649
			High	Low	15.625	4.471
				High	12.324	4.850
		Environment	Low	Low	17.771	4.780
				High	20.511	4.125
			High	Low	13.706	4.850
				High	15.167	5.163
	High	Health	Low	Low	44.400	4.780

Outcome Variable	Personal Relevance Category	Risk Frame Category	Demographic Similarity Category	Scene Similarity Category	Estimated Marginal Means	Standard Error
				High	46.032	5.079
			High	Low	48.706	4.850
				High	41.893	5.344
			Low	Low	46.618	4.850
		Environment		High	48.300	4.471
			High	Low	40.244	4.416
				High	43.147	4.850
Response Efficacy (Conserve water)	Low	Health	Low	Low	56.469	5.139
				High	50.784	4.779
			High	Low	55.100	4.596
				High	42.971	4.985
		Environment	Low	Low	60.657	4.914
				High	53.957	4.240
			High	Low	55.647	4.985
				High	50.300	5.307
	High	Health	Low	Low	77.059	4.985
				High	79.645	5.221
			High	Low	71.882	4.985
				High	71.778	5.595
		Environment	Low	Low	71.824	4.985
				High	71.231	4.655
			High	Low	69.756	4.540
				High	70.941	4.985
Response Efficacy (Seek information one week)	Low	Health	Low	Low	33.788	5.304
				High	35.730	5.009
			High	Low	30.100	4.817
				High	34.088	5.225
		Environment	Low	Low	27.629	5.150
				High	24.064	4.444
			High	Low	16.676	5.225
				High	19.100	5.562
	High	Health	Low	Low	57.371	5.150
				High	57.516	5.472
			High	Low	61.235	5.225
				High	59.929	5.758
		Environment	Low	Low	44.529	5.225
				High	43.000	4.879
			High	Low	32.317	4.758
				High	41.176	5.225
Response Efficacy (Seek information	Low	Health	Low	Low	32.242	5.150
				High	36.892	4.864

Outcome Variable	Personal Relevance Category	Risk Frame Category	Demographic Similarity Category	Scene Similarity Category	Estimated Marginal Means	Standard Error
when there is time)			High	Low	28.575	4.678
				High	30.971	5.074
			Low	Low	27.086	5.001
				High	20.957	4.315
		Environment	High	Low	18.676	5.074
				High	22.333	5.402
			Low	Low	56.686	5.001
				High	56.645	5.314
		Health	High	Low	60.971	5.074
				High	61.679	5.591
	High		Low	Low	42.265	5.074
				High	46.333	4.737
		Environment	High	Low	32.390	4.620
				High	45.824	5.074

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[1] Parasocial interaction refers to the imagined face-to-face relationship between the audience and the character(s) in narrative (Horton & Wohl, 1956; Moyer-Gusé, 2008).

[2] The Green and Brock (2000) version of the transportation scale contained 11 general items and 8 items specific to vivid imagery in the narrative. In the original 11-item version measured for the main study (4 items were later dropped), nine of the items matched those in Green and Brock's general 11- item version, but two items were replaced with questions about vivid imagery. Specifically, "The events of the narrative are relevant to my everyday life" and "The events in the narrative have changed my life" were replaced with "I have vivid images of the characters in the story" and "I have vivid images of the scenes in the story."

[3] These three items were reverse-coded before doing all analyses involving the transportation scale.

[4] The article by Greenough et al. (2001) was part of an assessment about the health effects of climate variability and change that was sponsored by the United States Environmental Protection Agency (EPA).

[5] The test for linearity suggested that attitude to climate change had a nonlinear relationship with perceived scene similarity and perceived demographic similarity, however those two variables (the latter two) were not part of the main dependent variables of interest.

[6] In the dissertation narratives, high scene similarity was represented by an urban scene, and low scene similarity was represented by a rural scene. The manipulation check showed that participants perceived the urban scene to be more similar to their locale than the rural scene.

[7] Sjöberg (2004) argued that the virtues of the psychometric paradigm are based on improper data analyses, specifically the use of means versus raw scores. Sjöberg claimed that when means are used the dread and unknown dimensions account for as much as 80% of the variance in risk perception, but when raw scores are used, these dimensions account for only 20 - 25% of the variance. Furthermore, Sjöberg (2000; 2004) contended that even with additional dimensions, the psychometric paradigm is still left wanting as a means of explaining risk perception, as it rarely goes beyond explaining 30 – 40% of the variance when raw scores, rather than means are used in the factor analyses.